

The Moderating Effects of Appearance Commentary on the Relationship  
Between Weight Status and Physical Activity Participation in Female  
College Students

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## **Abstract**

When looked at individually, overweight status and a higher frequency of negative appearance commentary (AC) are associated with lower physical activity (PA) levels. However, the combined effect has yet to be examined. The purpose of this study was to examine if the frequency of AC moderated the relationship between weight status and PA in college-aged females. No significant differences in PA levels ( $F(1,99)=2.41$ ,  $p=.12$ ) were found between the Never Overweight and Previously/Presently Overweight groups. Significant correlations existed for both negative AC ( $r=-.30$ ,  $p=.00$ ) and positive AC ( $r=.20$ ,  $p=.05$ ) with PA participation. AC did not significantly moderate the relationship between weight status and PA ( $F(2,95)=.65$ ,  $p=.52$ ,  $R^2$  adjusted=.13) as the interaction term did not account for any additional increase in variance ( $\Delta R^2=.01$ ). Overall, AC frequency does not moderate the relationship between weight status and PA; other predictor variables should be explored.

Key words: Appearance Commentary, Physical Activity, Weight, Women, Moderation

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## Table of Contents

Abstract.....	1
Acknowledgements.....	
CHAPTER 1: REVIEW OF LITERATURE.....	1
Importance of Physical Activity .....	1
Weight Status and Physical Activity.....	3
Weight Loss History and Physical Activity.....	5
Social Factors and Physical Activity .....	7
Negative Appearance Commentary .....	7
Source of Teasing .....	11
Gender Differences in Appearance Commentary .....	13
Positive Appearance Commentary.....	14
Weight Status and Appearance Commentary .....	18
The Effect of Appearance Commentary on Behaviour.....	21
Appearance Commentary and Physical Activity .....	22
Weight status, Appearance Commentary and Physical Activity Behaviour.....	22
Summary .....	25
CHAPTER 2: RATIONALE, PURPOSE, & HYPOTHESES .....	27
Rationale .....	27
Purpose Statement.....	29
Specific Objectives .....	29
Hypotheses.....	29
CHAPTER 3: METHODOLOGY .....	33
Participants.....	33
Table 1. <i>Demographic Means and Standard Deviations (SD) by Weight Group</i> .....	33
Measures .....	34

Demographic Variables .....	34
Procedures.....	38
CHAPTER 4: RESULTS.....	40
Data Analysis.....	40
Results.....	43
Table 2. <i>Means and Standard Deviations (SD) by Weight Group</i> .....	43
Hypotheses Testing.....	43
Table 3. <i>Correlations between Appearance Commentary (AC) and Vig/Mod IPAQ score</i> .....	44
Table 4. <i>Correlations between Appearance Commentary (AC) and Vig/Mod IPAQ score by Group</i> .....	45
Figure 1. <i>Moderator Model</i> .....	47
Figure 2. <i>Modified Moderator Model</i> .....	47
Table 5. <i>Hierarchical Multiple Regression Predicting Vigorous/Moderate IPAQ Scores</i> .....	49
CHAPTER 5: DISCUSSION.....	50
Descriptive Data .....	50
Research Question #1: Weight Status and Physical Activity.....	50
Research Question #2: Appearance Commentary and Physical Activity .....	57
Research Question #3: Test of Moderation.....	63
Limitations .....	65
Implications .....	67
Future Directions .....	69
Conclusion .....	71
References.....	72
Appendix A: Group Classification Chart.....	93
Appendix B: Demographic Information .....	94
Appendix C: Perceived Weight History Questionnaire .....	95
Appendix D: Verbal Commentary on Physical Appearance Scale (VCOPAS).....	97

Appendix E: International Physical Activity Questionnaire (short) .....	99
Appendix F: Current Height and Weight Measurements.....	100
Appendix G: Ethics Clearance.....	101
Appendix H: Letter of Invitation .....	102
Appendix I: Informed Consent .....	103
Appendix J: Recruitment Poster .....	104
Appendix K: Debriefing Form.....	105

## **CHAPTER 1: REVIEW OF LITERATURE**

### **Importance of Physical Activity**

PA is “any force exerted by skeletal muscle that results in energy expenditure above resting level” (Caspersen, Powell, & Christenson, 1985, p.126) and includes a range of activities such as sport, exercise, and activities of daily living. Based on the overwhelming evidence, it is well known regular PA contributes to many positive physiological and psychological outcomes. Regular exercise can aid in the prevention of diseases such as cancer (Friedenreich & Orenstein, 2002), cardiovascular disease (Stampfer, Hu, Manson, Rimm, & Willett, 2000) and type II diabetes (Hu et al., 2001). Among some of the other physiological benefits, PA has been shown to increase immune system function (Pedersen & Hoffman-Goetz, 2000), enhance brain function (Cotman & Engesser-Cesar, 2002), increase bone growth and strength (Turner & Robling, 2005) and increase the amount of HDL (or good) cholesterol in the blood (Campaigne, Fontaine, Park, & Rymaszewski, 1993). In addition to the many positive physical outcomes, exercise provides many mental and emotional benefits including: body image improvements (Hausenblas & Fallon, 2006), increased quality of life in cancer and heart disease patients (Courneya & Friedenreich, 1999; Radzewitz et al., 2002), and reduction of stress, anxiety and depressive symptoms (Salmon, 2001).

Despite the evident physiological and psychological benefits, most people across all age groups still do not meet the recommended daily guidelines for PA levels (CFLRI, 2010). In children, PA levels decline steadily throughout the school years, and decrease at substantially higher rates in girls (Sallis, 1993; Sallis, Alcaraz, McKenzie, & Hovell, 1999). Similarly, in adolescents, there is a steady decrease in PA levels and again, even

more of a drop in participation in adolescent girls (Goran, Gower, Nagy, & Johnson, 1998). The Canadian Fitness and Lifestyle Research Institute (CFLRI ) recently conducted a study to measure the PA levels of Canadian youth over a span of three years, between 2007-2009. The results indicate the greatest activity levels occur in the 5-10 year age group which is followed by a steady decline in PA levels through ages 11-14, with the lowest PA levels among children and adolescents in the 15-19 year age group for both boys and girls. Canadian girls also have lower levels of PA than Canadian boys starting in childhood and continuing into adolescence (CFLRI, 2010). Low physical activity rates appear in adulthood (aged 20 and older) as well, as 55% of Canadian women and 49% of Canadian men were classified as inactive in 2007-2009 based on self-reported PA levels (CFLRI, 2010). Therefore, encouraging regular PA participation early is important for healthy physical and mental development. In order to slow, and ideally prevent, the rates of PA decline, it is important to determine what factors are related to the low levels of participation. Determining the reasons for the decrease in women's PA participation is especially important, because of the greater rates of decline and the significant benefits these women are missing.

In previous research, women have identified several reasons for their lack of PA: lack of time, involvement in other activities, peer and environmental influences, and psychological influences (Biddle, Whitehead, O'Donovan, & Nevill, 2005). Among the psychological factors that have been consistently shown to influence PA participation is self-efficacy. Higher self-efficacy levels tend to be associated with increased PA participation, especially in adolescent girls (Dishman et al., 2004). In a review study examining the correlates of PA participation, Trost, Owen, Bauman, Sallis and Brown



(2002) reported a strong, positive association between self-efficacy and PA participation. Further, self-motivation, enjoyment of exercise and expected benefits all had consistent positive associations with PA participation as well, although not as strong a correlation as self-efficacy (Troost et al., 2002). Recently, an emphasis has been placed on exploring psychological influences on PA, with much research focusing on body image. Body image is “a loose mental representation of body shape, size, and form which is influenced by a variety of historical, cultural and social, individual, and biological factors, which operate over varying time spans” (Slade, 1994, p. 502). A negative relationship has been shown to exist between body image disturbance (e.g., body dissatisfaction) and exercise behaviour (Davis, 1990; Loland, 2000), in that those with greater the body image disturbance are less likely to engage in regular exercise, than those with less body image disturbance.

### **Weight Status and Physical Activity**

In addition to psychological factors, biological factors can affect PA levels. One biological factor that has been consistently shown in the literature to be associated with lower PA levels is an individual's body weight (Troost et al., 2002). In general, individuals who have a greater body mass report lower levels of PA than those with less body mass. Most often, body mass index (BMI), which is a simple weight (in kg) to height (in cm<sup>2</sup>) ratio, is used to classify individuals as underweight (<18.5), normal weight (18.5-24.99), overweight (25.0-29.9), or obese (> 30.0; Health Canada, 2003). A higher BMI score, especially in the overweight or obese range, has been linked to lower levels of PA participation in children (Troost, Sirard, Dowda, Pfeiffer, & Pate, 2003), adolescents

(Garaulet et al., 2000; Janssen, Craig, Boyce, & Pickett, 2004), and adults (Cooper, Page, Fox, & Misson, 2000).

In one study, the relationship between body weight and PA was explored across several countries. Janssen et al. (2004) found a significant inverse relationship between BMI and PA participation in both boys and girls aged 11-15 in 29 of the 33 countries investigated. Further, it appears for individuals with a high BMI score, as the intensity level of PA increases, participation levels tends to drop. A negative relationship between vigorous exercise and weight status exists in both men and women, as obese and overweight individuals report significantly lower levels of vigorous PA than non-overweight individuals (Boutelle, Neumark-Sztainer, Story, & Resnick, 2002).

There are several explanations for why individuals who are overweight or obese report lower levels of PA. A higher rate of perceived exertion (RPE) is often reported by overweight or obese individuals compared with normal-weight individuals after participating in PA, making exercise seem less pleasant and more laborious (Ekkekakis & Lind, 2006). In addition to experiencing a higher RPE, overweight adult women report higher levels of social physique anxiety (a specific body image concern) and fear of negative evaluation during exercise, possibly contributing to lower levels of enjoyment and ultimately less PA participation as well (Ekkekakis & Lind, 2006; Hartmann et al., 2010). Overweight adolescents also report having fewer positive feelings towards PA and often perceive exercise as having fewer benefits than normal weight adolescents tend to perceive (Bourdeaudhuij et al., 2005).

Overweight children also report more barriers to PA participation than non-overweight children, with body-related barriers such as self-consciousness about how

their body looks during exercise described most often (Zabinski, Saelens, Stein, Hayden-Wade, & Wilfley, 2003). Overweight girls tend to report a significantly greater number of body-related barriers to PA than overweight boys (Zabinski et al., 2003). Despite strong evidence that regular exercise is an important aspect of long-term weight loss and maintenance (Miller, Kocaja, & Hamilton, 1997; Pronk & Wing, 1994), overweight adolescents often report using unhealthy weight control methods (i.e., purging, diet pills, skipping meals) more often than healthier approaches such as regular exercise, possibly seeking a “quick fix solution” (Boutelle et al., 2002).

### **Weight Loss History and Physical Activity**

In addition to an individual’s current weight, his/her past weight status and weight loss history can also play an important role in current exercise behaviour. Some research suggests that, in those who are formerly overweight, PA levels may be higher than those who are normal weight for several reasons (Annis, Cash, & Hrabosky, 2004). The idea of “phantom fat”, whereby a formerly overweight individual is still “haunted” by his/her old body image disturbances and weight concerns (Adami et al., 1998; Adami, Meneghelli, Bressani, & Scopinaro, 1999; Cash, Counts, & Huffine, 1990; Foster & Matz, 2002), may contribute to increased PA. Whereas weight loss may lead to some improvement in body satisfaction, this “phantom fat” phenomenon may also put pressure on formerly overweight individuals to maintain high levels of PA to prevent the backwards step of weight regain (Annis et al., 2004). This finding is consistent with research that shows a moderate amount of body image concern and weight preoccupation may work as effective motivation for weight loss, or maintaining a healthy weight through diet and exercise (Heinberg, Thompson, & Matzon, 2002).

In addition to holding onto their old self-perceptions, formerly overweight individuals may still struggle to be seen and treated differently from those around them. Formerly overweight women report not being able to completely shed their previous overweight stigma as people still view them as less healthy than always normal weight individuals, in spite of their health improvements (Mattingly, Stambush, & Hill, 2009). One suggestion could be that women, in general, attribute an individual's overweight status to flawed personality characteristics. Therefore, even with an overweight woman's best efforts to exercise, lose weight and become healthier, she may always be seen as an overweight person both from her own viewpoint and other women's perspectives despite her current size.

Individuals who have succeeded in losing weight through modifying their diet and exercise may have to exercise significantly more than individuals who have always been a healthy weight (Jakicic, Winters, Lang, & Wing, 1999). The Public Health Agency of Canada (2010) recommends an adult get 30-60 minutes of moderate PA a day. However, studies have shown in order to avoid weight regain, an individual who has recently experienced significant weight loss may need to have significantly greater levels of exercise than the recommended amounts to avoid weight regain. In one study, Jakicic et al. (1999) found individuals who adhered to the recommended amounts of exercise experienced significant weight regain, but those who exercised above the recommended values, greater than 280 minutes per week, maintained their weight loss and did not experience any weight regain over an 18-month exercise intervention. Further, intensity of exercise may also need to increase. To maintain long-term weight loss and avoid weight regain, the National Weight Control Registry suggests at least 26% of an

individual's PA be at a vigorous intensity level (Klem, Wing, McGuire, Seagle, & Hill, 1997). Therefore, individuals who have lost a significant amount of weight and intend to keep it off may have both elevated amounts and intensity levels in an average week, compared with an individual who has consistently been a normal weight all his/her life.

### **Social Factors and Physical Activity**

Several social factors have been recognized as possible influences on exercise behaviour. However, one of the most influential factors identified is social support from friends and family. Trost et al. (2002) conducted a review to determine the significant correlates of adult PA participation and found social support to consistently have a positive association with PA participation. Adult women who report high levels of social support from friends and family are more likely to have higher levels of PA participation than women who lack social support (Eyler et al., 1999), especially in college-aged women (Leslie et al., 1999). Low levels of social support from friends and family, associated with low PA levels (Leslie et al., 1999), may arise from interpersonal feedback such as AC. Negative feedback from social interactions, particularly focused on one's appearance, may have just as much of an effect as positive social support on an individual's PA participation. One common form of negative social feedback is the commentary received from others.

### **Negative Appearance Commentary**

AC is any verbal feedback, either positive or negative in nature, an individual receives from others regarding his/her physical appearance, including facial characteristics, body weight, and other physical attributes (Stormer & Thompson, 1996). Negative AC (i.e., appearance teasing) is an experience particularly common in

childhood and adolescence (Cash, 1995); as a result, these encounters could be significant contributing factors to a child's behaviour. Negative AC can range from what is intended to be harmless verbal remarks (e.g., "wow, a second helping of dinner?") to purely hurtful comments (e.g., "you look fat in that shirt"; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999).

Although negative AC can target many different aspects other than one's appearance, such as competence-related comments associated with academic, athletic or social skills, appearance comments tend to occur more often than competence-related feedback (e.g., comment about academic or athletic skills; Quinlan, Hoy, & Costanzo, 2009). Weight-related teasing (e.g., mean-spirited nickname related to an individual's weight), which is one of the dimensions of appearance-related commentary, is reported to occur more frequently and to be more upsetting than competency-related teasing in adolescents (Quinlan, et al., 2009). Shapiro, Baumeister, and Kessler (1991) found the same to be true in children, where negative appearance comments (i.e., facial characteristics, weight) are usually the common focus of feedback received from others. Not only does appearance-related teasing appear to occur most often, but it has also been linked to serious negative consequences. Negative appearance comments made about an individual's weight are associated with an increase in depression symptoms and even more seriously, thoughts of attempting suicide (Eisenberg, Neumark-Sztainer, & Story, 2003).

In one study, Eisenberg et al. (2003) found 30% of adolescent girls and 24.7% of adolescent boys reported being teased about their weight at one point in their lives by their peers. In a more recent study, even higher rates of appearance teasing were found,

with about 40% of boys and 50% of girls reporting receiving weight-related comments from others (Lo et al., 2009). Not only can direct teasing experiences affect an individual but indirect encounters may result in similar negative effects. Children and adolescents can learn vicariously through the experiences of others by witnessing classmates or friends receiving negative appearance comments from their peers (Jones & Crawford, 2006). Consistent with social learning theory (Bandura, 1986), this indirectly reminds the individual that physical characteristics are subject to critical comments and reinforces peer acceptance norms.

Many damaging outcomes can arise from negative appearance comments. Much of the research investigating the impact of AC has focused on its effect on body image, and related cognitions and behaviours. The frequency of AC has a large effect on these outcomes. In several studies, more frequent negative appearance comments were associated with higher body dissatisfaction, eating disturbances and depression symptoms in adolescent girls (Fabian & Thompson, 1989) and college-aged women (Thompson & Psaltis, 1988). Further, the frequency of negative AC was also related to poorer body image and lower self-esteem (Myers & Rosen, 1999). Given that a higher self-esteem is associated with healthier functioning, such as greater academic achievement and an overall greater well-being (Steinberg, 1999), the detrimental effects of negative AC should provide reason for concern.

The AC received during childhood appears to have an enduring effect into adulthood. A higher frequency of negative appearance comments experienced in childhood has been correlated with higher levels of body image disturbance in adulthood, even though the comments may not be occurring any longer (Cash, 1995; Jackson, Grilo,

& Masheb, 2000; Thompson & Heinberg, 1993; Thompson & Psaltis, 1988).

Specifically, greater body dissatisfaction (Grilo, Wilfley, Brownell, & Rodin, 1994) and low self-esteem in adulthood (McLaren, Kuh, Hardy, & Gauvin, 2004) have been linked to higher rates of negative appearance comments received in childhood. In one clinical study with obese women, the frequency of being teased about their weight as children or adolescents was negatively correlated with their own self-evaluation and positively correlated with body dissatisfaction when they were adults (Grilo et al., 1994). Overall, the more frequently negative appearance comments occur in childhood, the more body image disturbance experienced by the individual in adulthood (Herbozo & Thompson, 2006). However, one study found that for adolescents who reported feeling the most stressed about negative weight-related comments, infrequent comments appeared to be just as harmful as frequent comments about their body (Quinlan et al., 2009). This finding suggests even a few distressing encounters with negative weight-related comments could have serious and long-lasting negative implications.

A history of childhood negative appearance comments has also been shown to influence adult behaviour in the form of dieting behaviour and more seriously the development of eating disorders (Fredrickson & Roberts, 1997; Neumark-Sztainer et al., 2002; Thompson, 1991; Thompson, Covert, Richards, Johnson, & Cattarin, 1995; Thompson & Psaltis, 1988), particularly in female college students (Stormer & Thompson, 1996). Negative AC appears to be a key element in the relationship between an individual's weight and his/her eating behaviours. Overweight girls and boys who were teased about their weight had significantly higher rates of eating disturbances than overweight girls and boys who did not report experiencing weight-related teasing



(Neumark-Sztainer et al., 2002). Further, significantly greater amounts of negative appearance comments in childhood are reported from adolescent girls who have been identified as binge-purgers (Brown, Cash, & Lewis, 1989). Thus, disordered eating symptoms related to negative AC experiences in childhood have the potential to surface as early as adolescence.

The severity of the negative commentary is also an important characteristic of teasing experiences. More severe comments, where comments become more critical of an individual, can produce greater negative outcomes. Severe incidents of AC are related to more negative body image evaluations (Cash, 1995) and are likely to lead to less appearance satisfaction (Herbozo & Thompson, 2006). In summary, negative AC appears to be linked to several negative body image outcomes, a higher degree of distress associated with those teasing occurrences, and behaviour modification such as eating disturbances and depressive symptoms that develop early in life and continue to affect the well-being of an individual into adulthood.

### **Source of Teasing**

Research exploring how the source of negative AC (i.e., from peers, friends, parents, or siblings) affects an individual is just starting to emerge and has produced mixed results. Eisenberg et al. (2003) found negative comments from both peers and family members were related to very high rates of emotional health concerns such as low self-esteem, depressive symptoms, and suicide thoughts or attempts. Although negative AC from any source is considered harmful, peers have been identified as the most frequent source of teasing in children and adolescents (Cash 1995; Hayden-Wade et al., 2005; McLaren et al., 2004). Negative appearance comments received from peers often

lead to many social problems (e.g., difficulty making friends, social isolation) and self-esteem issues (Harter, 1990).

However, research also suggests, although not as common, that negative comments from family members are often reported to be more harmful than negative appearance comments from peers. Appearance teasing from siblings in particular, especially older brothers, is associated with higher levels of body dissatisfaction, social comparison tendencies and lower self-esteem levels (Keery, Boutelle, van den Berg, & Thompson, 2005). Studies investigating appearance comments made by parents have yielded conflicting results. In an early study, Cash (1995) found one third of women reported teasing comments made by mothers and brothers while growing up to be extremely upsetting. Additionally, children and adolescent girls report negative appearance comments received from their mothers had the largest impact on their weight-related attitudes and behaviours, such as weight loss attempts, concern with being fat and body esteem (Neumark-Sztainer et al., 2002; Smolak, Levine, & Schermer, 1999). However in another study, young girls stated negative appearance comments from their fathers and older brothers led to a greater negative effect on their self-perceptions (Keery et al., 2005). This may be because, for these young girls, fathers and brothers model male behaviour towards women. Negative appearance comments from a father or brother can shape a young girl's expectations for future social interactions with other males. More research is needed to determine if parents' AC does in fact have a greater influence on their children compared with AC received from their peers.

In addition to the direct effects of AC received from certain family members, indirect effects are also possible. For example, the prevalence of paternal teasing

increased the risk of a young girl having a sibling who teases as well, as the father models a behaviour siblings see as appropriate within the family dynamic (Keery et al., 2005). Ultimately, the more family members that tease an individual about his/her body, the greater the likelihood of negative outcomes, such as body dissatisfaction and low self-esteem (Keery et al., 2005). The individual being teased may begin to internalize those negative judgments made by family members as the truth, especially if (s)he receives the same negative feedback from multiple sources.

### **Gender Differences in Appearance Commentary**

In general, women report a higher frequency of negative appearance comments, specifically weight-related teasing, than men from both their peers and family members, and across all weight categories (Neumark-Sztainer et al., 2002). However, one study found no differences between boys and girls aged 10-14 years regarding the frequency of negative appearance comments experienced in both the overweight and non-overweight groups (Hayden-Wade et al., 2005). A gender difference may not emerge in children because negative appearance comments are so prevalent in both boys and girls during childhood (Cash, 1995). Gender differences may start to become more prominent in adolescence when physical appearance maturation begins to clearly distinguish gender characteristics. Most of the literature still shows a significant gender difference in the frequency of negative appearance comments experienced by adult males and females (Eisenberg et al., 2003; Faith, Leone, Ayers, Moonseong, & Pietrobelli 2002; Neumark-Sztainer et al., 2002).

In addition to negative AC frequency, the type of comments received during childhood and adolescence also affects self-esteem in adult men and women differently.

Gleason, Alexander, and Somers (2000) examined how three different types of teasing (competency, weight, and appearance) that occurred in childhood could predict self-esteem and body image in adult men and women. The only significant predictor for self-esteem in men was teasing related to their competence, with only a significant correlation between appearance teasing and male self-esteem (Gleason et al., 2000). On the other hand, for women, both appearance and competency teasing experienced while growing up significantly predicted self-esteem later as an adult (Gleason et al., 2000). Therefore, it would seem men's self-esteem has a stronger connection to competency teasing and may develop independently from appearance-related factors, while women's self-esteem appears to be more closely affected by AC.

Another gender difference relates to the effect AC has on body image. Gleason et al. (2000) found only weight-related teasing had an effect on male body image, where as all three types of teasing (weight, competence, and appearance-teasing) negatively affected female body image. Men's body image appears to be less sensitive to AC, and does not seem to be affected on as many levels as females. Different social norms for males and females may explain why men and women are affected differently by negative commentary, as greater emphasis is placed on appearance for females in Western culture (Gleason et al., 2000).

### **Positive Appearance Commentary**

The research regarding verbal feedback has predominantly focused on the harmful effects of negative AC, otherwise known as teasing. However, not all commentary is negative. Some commentary can be positive feedback intended to compliment an individual, whether it be about his/her appearance, intelligence, or other characteristics.

Few studies have explored the impact of positive commentary, such as compliments, and the majority of this research has focused on its impact on body image. Further, the research that has been conducted on positive AC has produced mixed results.

Positive comments typically do not occur as frequently as negative comments (Calogero, Herbozo, & Thompson, 2009). In addition, positive comments do not appear to be associated with as many harmful psychological effects as negative comments and are less likely to lead to body image disturbance (Herbozo & Thompson, 2006). McLaren et al. (2004) found positive comments regarding adult women's weight that were taken positively led to an increase in their body satisfaction. Much research suggests that the occurrence of positive appearance commentary generally has less harmful effects on one's self image and can even decrease negative mood (Fea & Brannon, 2006; Herbozo & Thompson, 2006) compared with negative commentary. Appearance compliments tend to boost a person's mood, especially in women who are high on trait self-objectification, as they care about what other people think of them and thrive on other people's approval (Fea & Brannon, 2006).

Although positive commentary generally leads to more positive effects, one recent study found positive commentary does not always lead to a positive outcome and can occasionally produce negative effects, such as greater body image disturbance (Herbozo & Thompson, 2006). Intended appearance compliments may result in a negative outcome because any comment made about the body, despite good intentions, can serve as a reminder to the recipient that others are evaluating the body (Herbozo & Thompson, 2006). Herbozo and Thompson found that positive commentary led to an increase in self-objectification, likely because of the focus placed on the body. Self-

objectification occurs when an individual, typically a woman, views her own body from a third-person perspective and internalizes the notion that her body is just an object to be viewed and evaluated by others (Fredrickson & Roberts, 1997). This self-objectification usually causes women to become preoccupied with monitoring their own physical appearance from a third person perspective, as if an observer. Consequently, a cyclical effect may develop from this viewpoint as body image disturbance formed from past experiences may then affect how an individual reacts to future AC, even if the comment is intended as a compliment.

Research suggests that one's interpretation of appearance compliments may depend on certain personality traits. Herbozo and Thompson (2006) found individuals who had poor appearance evaluation, high body dissatisfaction, low self-esteem, and low appearance investment rated positive body-related commentary as having a negative effect on their self-perception. This suggests that certain people may have a pre-disposition to positive AC affecting them in negative ways, based on their past experiences and body image disturbance. Calogero et al. (2009) found college-aged women who were high self-objectifiers reported higher levels of body dissatisfaction after receiving appearance compliments. Body surveillance, a symptom of self-objectification involving constant body monitoring (Aubrey, 2006), partially mediated this relationship. For these individuals, the good feeling that followed the appearance compliment led to an increase in their body surveillance, in turn producing higher body dissatisfaction because of the greater focus on their appearance. A woman's current body image may also alter how she receives and interprets positive commentary. Women with

greater appearance dissatisfaction are more likely to be negatively affected by positive comments based on their negative interpretation (Herbozo & Thompson, 2006).

Positive AC can also have an impact on social comparisons. Bailey and Ricciardelli (2010) found that the more positive comments received from others, the more downward social comparisons (i.e., to inferior targets) were made that typically lead to an overall positive feeling. This may be because individuals who receive more appearance compliments may have less body image disturbance, and therefore see themselves as superior to others, leading to more downward social comparisons. More research is needed to clarify the mixed results found regarding the effects experienced from positive AC.

Positive commentary also affects men and women in different ways. Males tend to interpret positive appearance comments as they were intended (i.e., positively), which often leads to increases in body image satisfaction (Ricciardelli, McCabe, & Banfield, 2000). However, unlike men, appearance compliments for women more often lead to feelings of dissatisfaction (McCabe, Ricciardelli, & Ridge, 2006; Ricciardelli et al., 2000). The gender differences with positive AC could exist for various reasons. For example, men are more likely than women to experience more positive than negative appearance comments (Fouts & Burggraf, 2000; Ricciardelli et al., 2000). Further, men tend to have an overall higher self-esteem (Kling, Hyde, Showers, & Buswell, 1999) than women, and therefore positive comments may have more significance for them. There have been several proposed reasons why men have higher self-esteem than women. One of those being different gender roles, as self-confidence has traditionally been stereotyped as a masculine characteristic (Kling et al., 1999). Since AC occurs more frequently and

seems to have a greater effect on women, research should focus on this group in particular to reduce the negative psychological outcomes.

Overall, positive AC does not appear to have the same impact, either immediate or long-term, as negative AC has on an individual's thoughts, feelings and behaviour. Positive comments are only weakly negatively correlated to body dissatisfaction scores, whereas negative appearance comments are moderately correlated to body dissatisfaction, drive for thinness, and bulimia symptoms (Bailey & Ricciardelli, 2010). Further, the frequency of negative comments was moderately correlated with lower self-esteem but the frequency of positive comments was only weakly associated with higher self-esteem (Nowell & Ricciardelli, 2008). Therefore, not only do positive comments affect a smaller number of dimensions but the magnitude of their effects is also weaker than those effects experienced from negative commentary. The effect into adulthood from compliments received during childhood and adolescence is more unclear than the negative effects known from childhood negative AC. Further, not all negative or positive comments about appearance occur in childhood. Positive comments received in present day do not appear to have the ability to "cancel out" the negative effect generated from childhood negative appearance comments (McLaren et al., 2004).

### **Weight Status and Appearance Commentary**

Nearly all children will experience some form of AC at one point in their lives, but there are certain targets likely to experience more frequent incidents of negative commentary. An overwhelming number of studies have identified a strong correlation between an individual's weight and the amount of negative AC he/she experiences. More specifically, individuals with a higher BMI, who are overweight or obese, report negative



commentary incidents more frequently compared to normal weight individuals (Faith et al., 2002; Falkner et al., 1999; Hayden-Wade et al., 2005; Janssen et al., 2004; McLaren, et al., 2004; Neumark-Sztainer et al., 2002; Wertheim, Koerner, & Paxton, 2001).

Overweight or obese individuals also report feeling more upset or bothered by the negative AC received than non-overweight individuals (Hayden-Wade et al., 2005; Neumark-Sztainer et al., 2002; Quinlan et al., 2009). This may simply be because overweight individuals tend to experience greater overall amounts of negative AC, specifically directed at their weight, and as a result may have greater body dissatisfaction from the repetitive negative experiences.

In addition to receiving more negative commentary, individuals with a higher BMI may also experience a greater negative effect from appearance-related commentary regardless of whether it is positive or negative. Herbozo and Thompson (2006) found individuals who had higher BMI scores reported that both negative and positive body-related comments had an overall negative effect on their body image disturbance and self-esteem than those with lower BMI. The fact that positive comments could possibly produce negative feelings may be surprising based on assumptions surrounding a compliment which are intended to make an individual feel better. Perhaps for individuals who are currently overweight, and who may not receive as many positive appearance comments, a compliment about their body may produce negative feelings because of the unfamiliarity surrounding those types of comments. Their self-esteem may not be centred on their appearance (McLaren et al., 2004), therefore a comment intended to boost their body-esteem could ultimately create feelings of distress because it may bring unwanted focus to their body. Another possible reason could be that individuals with a greater body

mass tend to have poorer body image quality of life, which relates to the impact body image has on one's daily life (Cash & Fleming, 2002; Cash, Jakatdar, & Williams, 2004). Therefore, if an individual already thinks poorly about his/her body, a single compliment is not likely going to alter his/her disapproving self-perceptions, and may contribute to the negative effect on his/her daily life activities. Overall, despite good intentions, simply providing an individual with an appearance compliment will not always lead to a positive feeling and could even lead to a negative reaction towards his/her body.

One group of individuals that often gets overlooked when discussing AC is the underweight group, as they experience more frequent negative AC than normal weight individuals (Neumark-Sztainer et al., 2002). Underweight women often report receiving nicknames directed at their weight status, such as “skinny bones” or “spaghetti sticks” (Kostanski & Gullone, 2007). Although the underweight group does experience slightly more frequent negative appearance comments than normal weight individuals, they do not appear to be affected by AC to the same extent as individuals in the overweight or obese category, especially if they are women. Further, it appears that underweight females are not as much of a target for appearance comments as underweight males. Kostanski and Gullone found teasing comments to be greatest for boys in both the underweight and overweight category compared with girls, where only the overweight category reported significantly higher amounts of teasing in girls. This may be because underweight females are seen as closer to the ideal image (i.e., model) whereas underweight males are seen as further from the ideal male body (i.e., muscular).

## **The Effect of Appearance Commentary on Behaviour**

In addition to an individual's weight status and weight-loss history, behaviours such as social interaction and eating can also be influenced by appearance-related commentary from others. Peer interaction is an important element in healthy child development; therefore it is reasonable to assume negative or positive comments received from others can shape an individual's social behaviour in very different ways. Often, feelings of stress and anxiety are reported from children who have experienced weight-related teasing possibly leading to further avoidance of social interaction due to feelings of apprehension (Fekkes, Pijpers, & Verloove-Vanhorick, 2003). By avoiding participation in social activities, these children isolate themselves further, possibly even leading to further negative appearance comments from peers.

In both female adolescents and adult women, negative AC is associated with eating disturbances ranging from dieting tendencies (Muir, Wertheim, & Paxton, 1999; Wertheim, Paxton, Schutz, & Muir, 1997) to more serious eating disturbances, such as eating disorders (Ata, Ludden, & Lally, 2007; Benas & Gibb, 2008; Keery et al., 2005; McLaren et al., 2004; Shomaker & Furman, 2009; Stormer & Thompson, 1996; Thompson & Heinberg, 1993). The frequency of negative AC has a positive correlation with eating behaviour in adult women; the more frequent the commentary the higher the levels of eating disturbance (Bailey & Ricciardelli, 2010). By contrast, positive AC appears to be unrelated to eating behaviour, as the frequency of appearance compliments has no effect on the likelihood of eating disturbance in adult women (Bailey & Ricciardelli, 2010). This provides further support to the notion that positive commentary

has less impact on behaviours in comparison with the significantly more harmful effects experienced from negative AC.

### **Appearance Commentary and Physical Activity**

Another behaviour that appears to be linked to AC is exercise participation. In general, negative commentary *during* PA (e.g., teasing during a physical education class) is associated with less PA (Faith et al., 2002). In addition to lower rates of PA, greater perception of weight criticism during PA were associated with less sport enjoyment and a preference for sedentary activities in children (Faith et al., 2002). Girls who reported high levels of body dissatisfaction and high levels of past weight criticism had low levels of future PA participation (Jensen & Steele, 2008).

The negative appearance comments that occur outside of the exercise environment, such as at school or at home, may affect participation levels differently than comments that occur during PA. A similar negative correlation between peer victimization (being the target of peers' aggressive acts including receiving insults) and PA was also found in another study; specifically, the greater the peer victimization experienced, the lower the PA behaviour in youth aged 8-18 years (Storch et al., 2007). More research is needed to determine if the environment in which negative AC, such as weight criticism, is received affects PA participation. Although limited, most studies to date have examined the acute (immediate) effects of AC on children and adolescents' PA behaviour and have not yet examined the long-term effects into adulthood.

### **Weight Status, Appearance Commentary and Physical Activity Behaviour**

A distinct relationship exists between an individual's weight status and his/her PA levels throughout the lifespan (Cooper et al., 2000; Garaulet et al., 2000; Janssen et al.,

2004; Trost et al., 2003). Overweight children will often admit to feeling embarrassed while participating in PA and sport and report being excluded from participation often because of their weight (Pierce & Wardle, 1997). There is limited, yet significant, evidence to illustrate how AC may play a crucial role within this relationship.

In one study, negative AC and possible psychosocial correlates experienced were compared between overweight children at a fitness camp and a sample of non-overweight children (Hayden-Wade et al., 2005). They found overweight children who reported more weight-related teasing tended to have a higher preference for sedentary activities and a lower preference for active or social camp activities, including PA (Hayden-Wade et al., 2005). The strong correlation between weight status, appearance teasing and activity preference were only evident within the overweight sample, which highlights the important dynamic that exists between weight status and teasing.

Another study also investigated how negative peer comments affected psychosocial attitudes and behaviours in a group of treatment-seeking overweight adolescents (Quinlan et al., 2009). A similar result was found in this overweight population, as adolescents with a higher BMI score who experienced more frequent weight-related teasing participated less in camp activities (Quinlan et al., 2009). Once again, the same significant correlation was not found for individuals with a lower BMI, as the frequency of weight-related comments did not have the same significant effect on their camp activity participation (Quinlan et al., 2009). Thus, the combination of being overweight and experiencing greater amounts of negative AC could work together to fuel a cycle of inactivity, possibly leading to further PA avoidance and even further weight gain.

The impact of a person's weight status in combination with his/her history of receiving AC on long-term PA behaviour has not been specifically examined to date. The effect these combined factors have on body image has, however, been explored. A child's history of negative AC is believed to mediate the relationship between his/her weight status and body image (Lunner et al., 2000), specifically increasing body dissatisfaction and drive for thinness. Both level of body dissatisfaction and drive for thinness may play an integral role in an individual's motivation to exercise, in hopes of improving their appearance (Lunner et al., 2000). Given the strong link between adult exercise behaviour and several body image factors, such as self-esteem (McDonald & Thompson, 1992), social physique anxiety (Lantz, Hardy, & Ainsworth, 1997) and body satisfaction (Strelan, Mehaffey, & Triggeman, 2003), a very similar dynamic may exist between weight status, a history of AC and adult PA.

The intent to either criticize or compliment the individual may also alter the relationship between weight status and PA behaviour. Although, a strong relationship appears to exist between a history of negative comments and adult body image disturbance (Cash, 1995; Jackson, Grilo, & Masheb, 2000; Thompson & Heinberg, 1993; Thompson & Psaltis, 1988), the same relationship has not been found between a history of positive commentary and body image because no one has examined this specific relationship to date. Therefore, a similar result may exist within the PA dynamic, where past negative AC may have a stronger association with adult exercise behaviour compared with positive comments.

## Summary

From the considerable amount of evidence in the literature, negative AC could be considered one, if not the most, psychologically damaging forms of peer victimization children experience (Keltner, Capps, Kring, Young, & Heerey, 2001). Many of the physical risks that are associated with being overweight do not arise until later in adult life. However, the psychological effects linked to being overweight, such as receiving greater amounts of negative commentary from others, can manifest themselves early and remain with an individual for years to come.

One of the possible harmful effects produced by negative AC is the effect those experiences may have on PA levels. Specifically, AC may contribute to the decline in PA levels in certain age groups (Gordon-Larsen, Nelson, & Popkin, 2004). Data collected by Active Healthy Kids Canada (2010) showed that only 12% of Canadian children and youth are getting the recommended amount of PA, 90 minutes of exercise per day, as set out by Canada's Physical Activity Guidelines.

AC may impact women's PA participation significantly more than males because females tend to receive higher amounts of negative appearance comments (Eisenberg et al., 2003; Lo et al., 2009), are more sensitive to body comments from others (Eisenberg et al., 2003; Neumark-Sztainer et al., 2002), and their self-esteem appears to be more closely linked to their appearance (Gleason et al., 2000). The combination of these factors may all contribute to the larger decline in PA levels in girls than in boys.

In general, AC has the ability to influence individuals' actions, whether it be their eating behaviours (Ata et al., 2007; Fredrickson & Roberts, 1997; Muir et al., 1994), social activities (Fekkes et al., 2003), or acute PA participation (Faith et al., 2002). In

addition to females being more vulnerable to AC, overweight and obese individuals appear to also be at an increased risk for harmful behavioural consequences because of the higher prevalence of negative AC experienced by overweight individuals (Quinlan et al., 2009). AC, especially negative comments, appears to play an important role in the relationship between an individual's weight status and his/her thoughts and behaviours (Shroff & Thompson, 2004; Thompson et al., 1995). Although some research claims appearance compliments can improve an individual's mood (Fea & Brannon, 2006), other studies have actually found that not all positive commentary is associated with positive outcomes (Herbozo & Thompson, 2006). As a result, compliments cannot simply be used to undo any damage caused by negative appearance remarks received in the past, the process appears more complex. However, the impact of positive AC on PA participation has yet to be investigated.

The effect of AC on an individual's behaviour as an adult, specifically PA, is also important to investigate further. With the extensive list of physical and psychological benefits from regular exercise participation, it becomes crucial to determine what factors prevent individuals, particularly females, from engaging in PA. Ultimately, the goal is to target those factors contributing to the decline in PA in order to motivate people to engage in an active, healthy lifestyle.



## **CHAPTER 2: RATIONALE, PURPOSE, & HYPOTHESES**

### **Rationale**

The physical and psychological benefits of regular PA are well-known in North American society. However, the majority of Canadians across all age groups and both genders fail to achieve the minimum recommended amount of PA in their daily lives. The Canadian Fitness and Lifestyle Research Institute (2010) found the average Canadian's daily PA level did not meet the recommended guidelines set out by the Public Health Agency of Canada in all provinces and territories. Low rates of PA start at a young age, as only 12% of Canadian children and youth (Active Healthy Kids Canada, 2010) are meeting Public Health recommendations. These poor habits, formed as children and adolescents, appear to continue into adulthood (aged 20 and older), as 55% of Canadian women and 49% of Canadian men were classified as inactive in 2007-2009 (CFLRI, 2010). Developing positive PA behaviour early in life is important to maintain a healthy, active lifestyle into adulthood. Therefore, determining possible reasons for the low levels of PA participation is vital to assist in developing exercise intervention programs designed to increase PA.

The literature examining the relationship between an individual's weight status and PA levels has consistently shown that a higher body mass (i.e., overweight, obese) is associated with lower levels of PA participation (Cooper et al., 2000; Garaulet et al., 2000; Janssen et al., 2004; Trost et al., 2003 ). Previous weight status can also impact PA behaviour, as formerly overweight individuals tend to maintain high levels of PA necessary to prevent weight regain (Annis et al., 2004). Strong associations between weight status and appearance commentary, which includes both positive and negative verbal remarks about one's physical appearance, have been found in the research. A

greater body mass (i.e., high BMI score) is linked to greater frequency of negative AC (Faith et al., 2002; Falkner et al., 1999; Hayden-Wade et al., 2005; Janssen et al., 2004; McLaren, et al., 2004; Neumark-Sztainer et al., 2002; Wertheim et al., 2001).

Appearance commentary may also be related to PA behaviour. A small number of studies have looked at the acute effects of negative AC experienced during PA on PA participation in children. These studies have found children who experience a greater frequency of negative AC during PA have lower levels of PA participation (Faith et al., 2002; Jensen & Steele, 2008).

However, the long term effect from AC on PA behaviour into adulthood has yet to be examined. Studies have shown a higher frequency of negative AC can influence adult body image (Cash, 1995; Jackson et al., 2000; Thompson & Heinberg, 1993; Thompson & Psaltis, 1988) and adult eating behaviour (Fredrickson & Roberts, 1997; Neumark-Sztainer et al., 2002; Thompson, 1991; Thompson et al., 1995; Thompson & Psaltis, 1988); thus, there is a strong possibility that adult PA behaviour may also be affected. Further, AC can be both positive and negative, both of which can influence outcomes such as body image or eating behaviour. Positive commentary tends to occur less frequently than negative commentary (Calogero et al., 2009) and is generally associated with less body image disturbance (Herbozo & Thompson, 2006). However, to date, no research has examined the impact of positive AC on PA behaviour in adulthood. Finally, given that both weight status and AC can impact PA, it is possible that they may work together to ultimately influence PA participation.

### **Purpose Statement:**

The purpose of this study was to examine if the frequency of appearance-related commentary moderated the relationship between weight status and PA behaviour in college-aged females. In addition, this study investigated if positive or negative AC moderated this relationship differently.

### **Specific Objectives:**

1. To examine the differences in college-aged females' current PA behaviour between two weight status groups (Never Overweight [NOW] and Previously/Presently Overweight [PPOW]).
2. To examine the relationship between the frequency of positive and negative AC and current PA behaviour in college-aged females.
3. To examine if the frequency of AC (both negative and positive) moderates the relationship between college-aged females' weight status and their current PA behaviour

### **Hypotheses:**

1. It was hypothesized that:
  - a. College-aged females who were previously or presently are overweight will have lower levels of PA participation compared to college-aged females who have never been overweight.

*Rationale:* Boutelle et al. (2002) found overweight adolescents were more likely to adopt unhealthy weight control strategies (i.e., purging, laxatives, diet pills, skipping meals) compared to normal weight individuals and therefore would be less likely to implement healthy weight-loss strategies such as exercise in their lifestyle. In addition, an individual's weight is

negatively related to PA participation, in that the more an adult individual weighs the lower his/her level of PA participation (Cooper et al., 2000).

2. It was hypothesized that:

- a. A higher frequency of negative AC will be associated with lower levels of PA participation.

*Rationale:* Negative AC received during PA participation has been linked to lower levels of PA, less sport enjoyment and a preference for participating in more sedentary activities (Faith et al., 2002). Therefore, an individual who experienced a high frequency of negative AC will likely report low levels of PA participation based on his/her lack of enjoyment from past experiences.

- b. A higher frequency of positive AC will be associated with higher levels of PA participation.

*Rationale:* Positive AC is generally associated with higher body satisfaction (McLaren et al., 2004) and tends to lead to an overall positive mood (Fea & Brannon, 2006; Herbozo & Thompson, 2006). Therefore, it is believed that an individual will feel more inclined to participate in PA if he/she has greater body satisfaction and an overall positive mindset.

3. It was hypothesized that the frequency of AC experienced (both negative and positive) would moderate the relationship between weight status and PA.

Specifically:

- a. College-aged females who were previously or are presently overweight who experienced high amounts of negative AC will have low predicted levels of PA participation in adulthood.

*Rationale:* Negative comments are reported to occur more frequently than positive appearance comments (Calogero et al., 2009) and the greater the commentary frequency the greater the effects on thoughts, feelings and behaviour (Fabian & Thompson, 1989; Herbozo & Thompson, 2006; Thompson & Psaltis, 1988). Therefore, the more often previously or presently overweight individuals received hurtful comments intended to criticize their body in their past, the less likely they are to engage in PA in the future.

- b. Never overweight college-aged females who experienced high amounts of negative AC will have high predicted levels of PA participation in adulthood.

*Rationale:* Negative AC received by non-overweight individuals does not occur for as many years and is reported as less upsetting than AC reported by overweight individuals (Hayden-Wade et al., 2005). In addition, although a significant correlation was found between frequent weight comments and less PA with overweight individuals, no significant correlation was found with non-overweight individuals (Hayden-Wade et al., 2005). This evidence suggests AC received by non-overweight individuals may not be impactful enough to be a barrier to PA compared with overweight individuals.

- c. College-aged females who were previously or are presently overweight who experienced high amounts of positive AC will have high predicted levels of PA participation in adulthood.

*Rationale:* Positive commentary is generally associated positive outcomes, such as an increase in body satisfaction (McLaren et al., 2004). Therefore, it is believed the more satisfied one is with her appearance the more likely she is to engage in PA.

- d. Never overweight college-aged females who experienced high amounts of positive AC will have low predicted levels of PA participation in adulthood.

*Rationale:* Unlike negative AC, positive appearance comments tend to only be weakly correlated with body dissatisfaction, drive for thinness and bulimia symptoms (Bailey & Ricciardelli, 2010). Normal weight individuals tend to have less body disturbance, and may be less likely to use body improvement tactics, such as exercise, because they are generally satisfied with their body.

## CHAPTER 3: METHODOLOGY

### Participants

The present study recruited 116 female undergraduate students from Brock University between the ages of 18 to 29 years with an overall sample mean age of 20.46 ( $SD=1.77$  years). The majority of participants (77%) were from Kinesiology ( $n=52$ ) or Physical Education ( $n=37$ ) programs. The exclusion criteria for participants in this study included varsity level athletes, underweight classification ( $BMI<18.5$ ) or any individual with a history of an eating disorder, as they may all have atypical PA levels. After screening the data for exclusion criteria, six cases were deleted from analysis (varsity athlete  $n=3$ ; underweight  $n=3$ ); therefore 110 were included in subsequent analyses.

Descriptive statistics were calculated for the NOW and PPOW groups (see Table 1). T-tests were conducted to examine differences on demographic variables between the two groups. Objective weight ( $t(99) = -4.51, p<.001$ ) and BMI ( $t(99) = -6.25, p<.001$ ) were the only variables with a significant difference between the two groups, as expected based on our weight group classification criteria. Age ( $t(99)=.394, p=.695$ ) and objective height ( $t(99)=1.50, p=.137$ ) were not significantly different.

Table 1

*Demographic Means and Standard Deviations (SD) by Weight Group*

Variable	NOW ( $n=56$ )		PPOW ( $n=45$ )	
	Mean	SD	Mean	SD
Age (years)	20.52	1.84	20.38	1.70
Objective Height (in)	65.90	2.53	65.16	2.38
Objective Weight (lbs)*	134.48	13.74	150.91	22.54
BMI *	21.75	1.61	24.98	3.42

\* $p<.001$

## Measures

Participants completed a series of questionnaires used to assess the following information (see appendices for all questionnaires):

**Demographic Variables.** Age, gender, academic major, varsity athlete status, height, weight, and eating disorder history were collected through self-report.

**Perceived Weight History.** This questionnaire was developed specifically for this study and was used to assess participants' perceived weight history. The questions were modified from two different sources: The Weight History Questionnaire, which is a component of the National Health and Nutrition Examination Survey (NHANES, 2010) and a study by Annis et al. (2004). The use of memory recall to investigate perceived weight history has been validated previously with several studies finding self-report recall of previous weight to be a valid measure of participant's actual weight at that point in time (Casey et al., 1991; McGuire, Wing et al., 1999; Stevens et al., 1990).

Participants were asked to report their perceived current height and weight, and recall their height and weight, one, two and three years prior to the date of participation. This information was used to calculate their BMI for the three set time periods to determine if the individual perceived herself to be overweight at any point in the three years preceding the date of participation in the study. Participants were also asked: "Have you ever been overweight by at least 10 lbs at any point in your lifetime (excluding pregnancy)?" If the participant answered "yes" to this question, she was asked to answer two follow-up questions: "What age were you when you were overweight?" and "How long were you overweight?" Participants then answered a question regarding their current weight: "How long have you been at the weight you are now?" Participants selected one



of the following options: less than 6 months, about 6 months, about 1 year, about 2 years, about 3 years, longer than 3 years. Lastly, participants were asked to look at a childhood figure rating scale (Collins, 1991) and select the picture that best represented their perceived childhood weight/shape. A similar question was asked using an adolescent figure rating scale (Sherman, Iacono, & Donnelly, 1995) to determine the participant's perceived weight/shape as an adolescent. This approach to assessing weight status during childhood and adolescence through figure drawings has been used previously as it is more reliable than weight and height recollections during this time (Annis et al., 2004). Participants were also asked to include the age of onset of menarche as this information may contribute to a woman's weight history.

**Verbal Commentary on Physical Appearance Scale (VCOPAS;** Herbozo & Thompson, 2006). The VCOPAS is a 21-item instrument that is used to assess the frequency and effect of negative and positive physical AC. Only the frequency subscales were used in the current study. The VCOPAS consists of three subscales: Negative Weight and Shape (10 items), Positive Weight and Shape (5 items), and Positive General Appearance (6 items). The Negative Weight and Shape subscale measures body-related comments that were interpreted to be negative (e.g., offensive to the individual; for example: "You need to start watching what you eat"). The Positive Weight and Shape subscale measures body-related comments that were considered to be positive (e.g., compliment; for example: "I wish I had a body like yours"). The Positive General Appearance subscale assesses comments that pertained to the individual's overall physical appearance and were interpreted as positive remarks (for example: "You are pretty"). Participants were asked to report how often they received each type of comment

using a 5-point scale ranging from 1 (*never*) to 5 (*always*). The validity and reliability of the VCOPAS were determined to be suitable for use with undergraduate female university students (Herbozo & Thompson, 2006).

**International Physical Activity Questionnaire- Short (IPAQ- S;** [www.ipaq.ki.se](http://www.ipaq.ki.se), 2001). The IPAQ- S consists of 4 items that assess the frequency and intensity of PA that young and middle-aged adults (15-69 years) take part in during their everyday lives. Participants were asked to answer the questions based on the last 7 days. Participants were asked to only think about physical activities that lasted for at least 10 minutes in duration and report how many days per week they engaged in vigorous (e.g., running), moderate (e.g., cycling), and light (e.g., walking) PA. For each level of activity, examples were provided that were suitable for the sample. If the participant checked the “none” box, she continued onto the next question. If the participant provided a response of one or more days per week she engaged in PA, then a follow-up question was asked regarding how much time was spent doing that specific intensity of PA on ONE of those days. A physiological unit of measure called a metabolic equivalent (MET), which is an estimate of the energy cost of an individual’s physical activities (Ainsworth et al., 2000), was used to calculate an individual’s overall PA level as a total MET-minutes/week score. Light activity was excluded from analysis based on Health Canada Physical Activity Guidelines (Bryan & Katzmarzyk, 2009) and the success of this approach used previously in several studies (Ainsworth et al., 2006; Faulkner, Arbour-Nicitopoulos, & Hsin, 2010; Prochaska et al., 2008). Therefore, the modified IPAQ score including just vigorous and moderate PA was used in all analyses. The IPAQ has been found to have acceptable reliability and validity, with a Spearman’s  $\rho = .80$  and  $.30$ , respectively, for

self-reported PA in adults aged 18-65 years from 12 different countries (Craig et al., 2003).

### **Body Mass Index (BMI)**

Objective measures of height and weight were obtained from each participant and used to calculate each participant's BMI. Height (without shoes) was measured to the nearest 0.1cm by the researcher. Weight was measured to the nearest 0.1kg using a Zenith scale by the researcher, with subjects wearing light clothing. BMI was calculated by dividing weight (kg) by height (cm)<sup>2</sup>. A BMI of <18.5 was classified as underweight, 18.5-24.99 was classified as normal weight, 25.0-29.9 was classified as overweight, and >30.0 was classified as obese (Health Canada, 2003). BMI classifications were later used to determine their current weight status classification.

### **Classification of Weight Groups**

BMI scores and Perceived Weight History Questionnaire responses were used to classify each participant into one of two groups: Never Overweight (NOW) and Previously or Presently Overweight (PPOW; See Appendix A). Individuals were classified into the NOW group if their current calculated BMI was between 18.5 and 24.9, therefore could not be overweight, and they met all of the following four criteria from the Perceived Weight History Questionnaire: (1) from the reported height and weight values for one, two and three years ago, the participant had a calculated BMI between 18.5 and 24.9 at all of those time points; (2) the participant did not report being overweight by at least 10lbs at any point in their life; (3) she circled figure 1, 2, 3, or 4 on the Childhood Figure Rating Scale; and (4) she circled figure 1, 2, 3, 4, 5 or 6 on the Adolescent Figure Rating Scale. Individuals were classified into the PPOW group if they

had a current BMI greater than 18.5, therefore could be overweight, and they met at least one of the four possible criteria from the Perceived Weight History Questionnaire. The criteria were: (1) from the reported height and weight values for one, two and three years ago, the participant had a calculated BMI greater than 25 at one of those time points; (2) the participant reported being overweight by at least 10lbs at some point in their life and was overweight for at least 6 months; (3) she circled figure 5, 6 or 7 on the Childhood Figure Rating Scale; or (4) she circled figure 7, 8, or 9 on the Adolescent Figure Rating Scale. It should be noted that all participants classified into the PPOW group actually met at least two of the four possible criteria.

## **Procedures**

Ethics clearance was obtained from the Brock University Research Ethics Board before the study began. Participants were recruited from various faculties at Brock University via undergraduate class announcements and posters placed around campus. Individuals interested in participating in the study were asked to contact the researcher by phone or e-mail. After the students expressed interest in participating in the study, the researcher provided an overview of the study requirements via a letter of invitation. If the participant was interested, the researcher then set up a convenient time for both parties to complete the study. All questionnaires were completed in a laboratory on campus either individually or in small groups. Upon arrival at the laboratory, participants were asked to provide informed consent. After giving informed consent, the participants were asked to complete demographic information and the questionnaire package which took approximately 20-30 minutes. The order of questionnaires (Perceived Weight History, VCOPAS, IPAQ-S) was counterbalanced to avoid order effects. Upon completion, the

participants returned the questionnaire package to the researcher and objective height and weight measurements were taken in private in the laboratory. Participants were then fully debriefed about the study. Participants who completed the study for a class assignment were given a signed copy of the letter of invitation as proof of one hour of credit towards their research participation assignment.

## CHAPTER 4: RESULTS

### Data Analysis

#### Treatment of Missing Data

All data were entered into PSAW 18.0 and screened visually for missing data. For those cases where data for an entire questionnaire were missing, the participant's data were not used for any analyses involving that questionnaire. Where specific items were missing, visual inspection determined the quantity and pattern of missing items, to ensure any missing data were random in nature. Overall, less than 5% of data were missing and there was no consistent pattern; therefore, an appropriate subgroup mean was used as a substitute for missing items (Tabachnick & Fidell, 2007).

#### Subscale Scoring

**Verbal Commentary on Physical Appearance Scale.** The overall mean frequency of the negative AC subscale for the 10 items was calculated. In addition, the overall mean frequency of the positive AC subscale for the total 11 items was calculated from both the Positive Weight and Shape and Positive General Appearance subscales, as recommended by Herbozo and Thompson (2006).

**International Physical Activity Questionnaire- Short.** The recommended IPAQ guidelines (<http://www.ipaq.ki.se/scoring.pdf>, 2001) were followed to account for extreme cases thought to be unreasonably high, in an attempt to normalize the distribution levels of activity based on the assumption that the average individual spends eight hours per day sleeping. The guidelines are as following: (1) total weekly duration of PA could not exceed 960 minutes; and (2) total daily duration of PA could not exceed 180 minutes. If the total weekly duration exceeded 960 minutes, that case was excluded from analysis. If the daily duration exceeded 180 minutes, that case was recoded to the

maximum value of 180 minutes (<http://www.ipaq.ki.se/scoring.pdf>, 2001). No cases exceeded a weekly total of 960 minutes. However, four cases exceeded the total daily duration of 180 minutes and as a result were recoded to the value of 180 minutes.

Next, the total vigorous and moderate MET-minutes/week score was calculated using the modified formula: (4.0 METs x number of minutes x number of days of moderate intensity activity) + (8.0 METs x number of minutes x number of days of vigorous intensity activity). This yielded a total score representing the number of MET minutes per week participants engaged in moderate and vigorous PA.

### **Data Screening**

**Outliers.** Outliers are extreme values that may distort the results of a statistical analysis. The data set was checked for both univariate and multivariate outliers in each group. Univariate outliers for continuous variables are those with very large standardized scores (z-scores), which are disconnected from other z-scores. According to Tabachnick and Fidell (2007), potential outliers can be identified by z-scores greater than 3.29 ( $p < 0.001$ , two-tailed test). Both continuous variables in this analysis, verbal AC and IPAQ scores, were checked for univariate outliers. No outliers were found within the verbal AC scores and therefore no cases were deleted. Z-scores were calculated for the IPAQ vigorous and moderate scores and nine cases were identified as having z-scores  $> 3.29$ , therefore these cases were deleted.

Multivariate outliers are “cases with an unusual combination of scores on two or more variables” (Tabachnick & Fidell, 2007, p.73). To check for multivariate outliers, Mahalanobis’ distance was calculated for each case; the calculated values were evaluated using the  $\chi^2$  distribution, with degrees of freedom equal to the number of variables of

interest ( $n = 3$ ) at  $p < .001$ . Using these criteria, any case with a Mahalanobis distance  $\geq 16.27$  was considered a possible multivariate outlier (Tabachnick & Fidell, 2007). All values of Mahalanobis' distance were less than 16.27, therefore no multivariate outliers were identified in this sample.

**Normality of Sampling Distribution: Skewness and Kurtosis.** The majority of statistical tests are based on the assumption of a normal distribution. There are two aspects to the normality of a distribution: skewness and kurtosis. Skewness describes the symmetry of a distribution, while kurtosis refers to the peakedness of the distribution. Both skewness and kurtosis were calculated for each variable by group, and were tested against a null hypothesis of zero by using a significance test as outlined by Tabachnick and Fidell (2007). All values were non-significant, indicating no evidence of abnormal skewness or kurtosis within this sample.

**Linearity.** Linearity occurs when two variables are related by a straight line relationship. The assumption that the data is linear was assessed by examining bivariate scatterplots by group for all possible combinations of variables (Tabachnick & Fidell, 2007). No evidence of a non-linear relationship was found examining the scatterplots within the four combinations of variables.

**Homogeneity of Variance.** Homogeneity of variance describes an ideal situation where there is equal or similar variance across all groups for each independent variable. This was tested by calculating  $F_{\max}$  (ratio of the largest to the smallest variances) and comparing its values as suggested by Tabachnick and Fidell (2007), given that the sample size for each group was approximately equal (within a ratio of 4:1). Within this sample, all  $F_{\max}$  values (Neg. AC: 2.01; Pos. AC: 1.15; IPAQ: 1.48) were less than the maximum



acceptable level of 10, therefore there was no violation of the assumption of homogeneity of variance.

**Multicollinearity.** No evidence of multicollinearity existed within this sample as all bivariate correlations were  $<.80$  (Tabachnick & Fidell, 2007).

## Results

**Descriptive Statistics.** Descriptive statistics were calculated for the NOW and PPOW groups for each study variable (see Table 2).

Table 2

*Means and Standard Deviations (SD) by Weight Group*

Variable	NOW ( $n=56$ )		PPOW ( $n=45$ )	
	Mean	SD	Mean	SD
Vig/Mod IPAQ	1531.00	1057.59	1835.11	868.12
Frequency Negative AC	1.70	0.52	1.94	0.73
Frequency Positive AC	3.29	0.56	3.16	0.52

*Note.* AC = appearance commentary and ranges from 1 (*never*) to 5 (*always*). Vig/Mod IPAQ = vigorous/moderate PA, measured in MET-minutes/week.

## Hypotheses testing

**Research Question 1.** An analysis of variance (ANOVA) was conducted to test the first hypothesis that PA would differ according to weight status (NOW or PPOW). Weight group served as the independent variable and total vigorous and moderate MET-minutes/week IPAQ score was the dependent variable. Results from the ANOVA showed there were no significant differences in total vigorous and moderate MET-minutes/week IPAQ scores ( $F(1,99)=2.41, p=.12$ ) between the two groups. In other words, although the

PPOW group had a higher mean total vigorous and moderate IPAQ score, it was not statistically different than the mean IPAQ score from the NOW group.

**Research Question 2.** A correlation analysis was conducted to test the second hypothesis designed to examine the relationship between negative and positive AC (AC) and PA levels. A Pearson bivariate correlation was calculated between the mean frequency of negative AC and the mean frequency of positive AC with total vigorous and moderate IPAQ scores. Overall, both the frequency of negative AC ( $r=-.30, p=.00$ ) and the frequency of positive AC ( $r=.20, p=.05$ ) were significantly correlated to the mean total vigorous and moderate IPAQ score (see Table 3).

Table 3

*Correlations between Appearance Commentary (AC) and Vig/Mod IPAQ score*

Variable	Vig/Mod IPAQ	Freq. Negative AC	Freq. Positive AC
Vig/Mod IPAQ	-	-0.30**	0.20*
Freq. Negative AC		-	-.20*
Freq. Positive AC			-

*Note.* Vig/Mod IPAQ = vigorous/moderate PA, measured in MET-minutes/week. Freq. Negative AC= frequency of negative appearance commentary. Freq. Positive AC= frequency of positive appearance commentary.

\*\* $p<.001$ , \* $p<.05$

The frequency of negative AC had a moderate-sized, negative relationship with the IPAQ score, thus the more frequently an individual reported experiencing negative AC, the lower her vigorous and moderate IPAQ score tended to be. The frequency of positive AC had a small to medium-sized, positive relationship with the IPAQ score, thus the more frequently an individual reported positive AC, the higher her vigorous and moderate IPAQ score tended to be. As an addition to this research question, correlations between AC and IPAQ scores were examined within each of the groups (see Table 4).

Table 4  
*Correlations between Appearance Commentary (AC) and Vig/Mod IPAQ score by Group*

Variable	Vig/Mod IPAQ	Freq. Negative AC	Freq. Positive AC
Vig/Mod IPAQ	-	-.53**	.20
Freq. Negative AC	-.19	-	-.30*
Freq. Positive AC	.23	-.08	-

*Note.* NOW group below the diagonal; PPOW group above the diagonal. Vig/Mod IPAQ = vigorous/moderate PA, measured in MET-minutes/week. Freq. Negative AC= frequency of negative appearance commentary. Freq. Positive AC= frequency of positive appearance commentary.

\*\* $p < .001$ , \* $p < .05$

Within the NOW group, no significant correlations were found with IPAQ scores for either negative AC ( $r = -.19$ ,  $p = .16$ ) or positive AC ( $r = .23$ ,  $p = 0.83$ ). However, within the PPOW group a significant correlation was found with negative AC ( $r = -.53$ ,  $p = .00$ ) and IPAQ scores, but not with the positive AC ( $r = .20$ ,  $p = .18$ ). For those individuals in the PPOW group, the frequency of negative AC had a strong-sized, negative relationship with the vigorous and moderate IPAQ score. As a result, for those who were either previously or are presently overweight, a higher frequency of negative AC was correlated with much lower vigorous and moderate IPAQ scores.

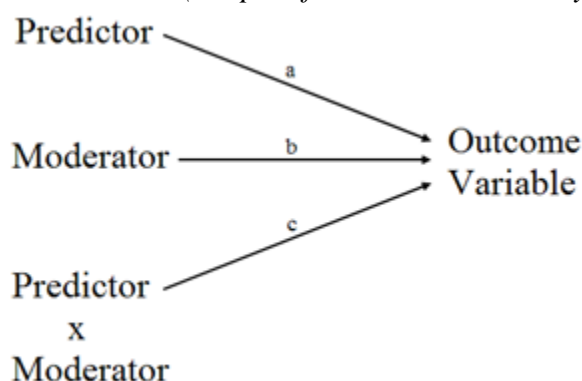
**Research Question 3.** A hierarchical multiple regression analysis was conducted to test whether the frequency of negative and positive AC moderated the relationship between weight status and PA. A moderator is a variable that may alter either the strength or direction of a relationship between a predictor variable and an outcome variable (Baron & Kenny, 1986; Holmbeck, 1997; James & Brett, 1984). Within a hierarchical multiple regression, a moderator interaction tests the dependency of one variable on the level of another (Frazier, Tix, & Barron, 2004). The predictor variables and interaction

terms are entered into the hierarchical regression analysis in specified blocks or steps determined by the researcher (Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003; Jaccard, Turrisi, & Wan, 1990; West, Aiken, & Krull, 1996).

Prior to conducting the regression analysis, the categorical predictor variable must be dummy coded to correspond with the number of levels in the categorical variable (number of levels minus one; Frazier et al., 2004). In addition, it has been recommended that the continuous variable be centred prior to analysis in order to reduce the multicollinearity between the predictor variable and the interaction term (Baron & Kenny, 1986; Cohen et al., 2003; Cronbach, 1987; Jaccard et al., 1990; West et al., 1996). To centre the data, the sample mean is subtracted from all continuous variable cases to produce a revised sample mean of zero (Holmbeck, 2002). Lastly, product terms are calculated to represent the interaction between the predictor variable and the moderator, using the newly dummy coded predictor variable and the centred continuous moderator variable (Aiken & West, 1991; Cohen et al., 2003; Jaccard et al., 1990; West et al., 1996).

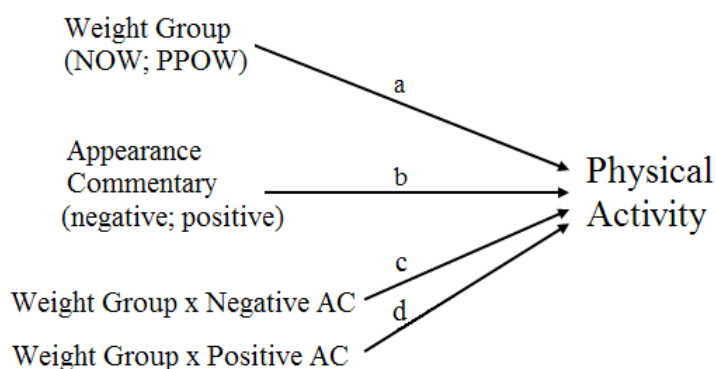
The variables are generally entered as follows: (1) the predictor variable (i.e., dummy coded categorical variable) and the moderator variable (i.e., centred continuous variable) are entered in the first step; (2) all product terms (i.e., dummy coded predictor x centred continuous moderator) are entered together in step two (Aiken & West, 1991; Cohen et al., 2003; Dunlap & Kemery, 1987; Holmbeck, 1997; Jaccard et al., 1990; McClelland & Judd, 1993; West et al., 1996). Figure 1 shows the general moderator model from Baron and Kenny (1986) adapted for use in this study.

Figure 1. *Moderator Model (adapted from Barron & Kenny, 1986)*



In this study, prior to conducting analysis, the categorical predictor variable (weight status) was dummy coded. As there were only two weight classification groups, the number 1 denoted membership in the PPOW group and 0 denoted membership in the NOW group. The continuous predictor variables (frequency of negative and positive AC) were centered by subtracting the sample mean from each individual's mean frequency of negative and positive AC scores, to produce a revised sample mean of zero. In addition, two product terms were calculated using the newly dummy coded weight status variable and the centred AC variables, one for negative AC and one for positive AC. Figure 2 show the moderator model for the third research objective.

Figure 2. *Modified Moderator Model*



The order the variables were entered into the regression analysis was as follows: on Step 1, the dummy coded weight status variable was entered to test for a main effect of weight status on vigorous and moderate IPAQ score. In addition, the centred mean frequencies of negative and positive AC scores were also entered on the first step to test for a main effect on vigorous and moderate IPAQ score. On Step 2, the two interaction terms (dummy coded weight status x centred frequency of negative AC; dummy coded weight status x centred frequency of positive AC) were entered to test the moderation hypothesis. For Step 1, the overall model was significant, accounting for approximately 16% of the variance in vigorous and moderate PA ( $F(3, 97) = 6.27, p = .00, R^2 \text{ adjusted} = .14$ ). On Step 2, there was no additional increase in variance accounted for ( $\Delta R^2 = .01$ ), and the new model was no longer significant ( $F(2, 95) = .65, p = .52, R^2 \text{ adjusted} = .13$ ). According to Aiken and West (1991) and Frazier et al. (2004), when the interaction terms are non-significant and there is not a strong theoretical rationale for including the interaction terms, the model including only the main effects (for group, negative AC and positive AC) should be interpreted. Therefore, the model from Step 1 was interpreted. (see Table 5).

Significant main effects were found for the dummy coded weight group variable ( $p = .02$ ) and the centred negative AC ( $p < .001$ ), but not with the centred positive AC ( $p = .09$ ). The unstandardized beta coefficient for dummy coded weight group was 457.92 (see Table 5). This means for an individual in the PPOW group, we can significantly predict their vigorous and moderate IPAQ score to be, on average, 457 units greater than an individual in the NOW group. The unstandardized beta coefficient for centred negative AC was -488.67 (see Table 5). This means for every one incremental unit

increase in the frequency of negative AC, we can significantly predict an individual's vigorous and moderate IPAQ score to be 488.67 units less.

Table 5

*Hierarchical Multiple Regression Predicting Vigorous/Moderate IPAQ Scores*

Variables	Unstandardized Coefficients		Standardized Coefficients	
	<i>B</i>	Std. Error	Beta	t
Step 1				
Dummy- Group	457.92	187.20	.23	2.45*
Centred Negative AC	-488.67	150.93	-.31	-3.24**
Centred Positive AC	297.71	173.67	.16	1.71
Step2				
Dummy- Group	441.3	188.73	.22	2.34*
Centred Negative AC	-355.89	241.09	-.23	-1.48
Centred Positive AC	420.06	223.61	.23	1.88
Interaction Negative AC	-254.11	312.31	-.13	-.81
Interaction Positive AC	-335.85	358.45	-.12	-.94

*Note.* Dependent variable: Vig/Mod IPAQ score; Dummy code: 0=NOW, 1=PPOW. AC= appearance commentary.

\*\*p<.001, \*p<.05

## **CHAPTER 5: DISCUSSION**

The aim of the present study was to examine the relationship between weight status, appearance-related commentary and PA. Specifically, this study looked at the moderating effect of the frequency of AC on the relationship between weight status and PA in college-aged females. To gain a better understanding of the moderating effect of different types of commentary, negative and positive AC were analyzed separately.

### **Descriptive Data**

In general, the participants in the present study were relatively highly active, although not atypically active. Our participants' mean moderate and vigorous minutes per week were higher than values found by Morrow et al. (2006), who also used the IPAQ to measure PA levels in college-aged women. However, their levels were similar to those found by Gow, Trace, and Mazzeo (2010). Consistent with the above mentioned studies, the women in the present study reported engaging in more vigorous PA than moderate activity (Gow et al., 2010; Morrow et al., 2006).

In addition, the sample also reported amounts of AC from others consistent with other samples of college-aged women. The mean frequency scores for both negative and positive AC in this study were within a similar range to other studies using the VCOPAS to assess AC in college-aged women for both negative comments and positive comments (Herbozo & Thompson, 2006; 2009).

### **Research Question #1: Weight Status and Physical Activity**

The first research objective examined the relationship between body weight and PA in college-aged women, by examining differences in moderate and vigorous PA levels between two weight groups (NOW and PPOW). The results for this first research question did not support the hypothesized outcomes. We hypothesized that college-aged



females who were in the PPOW group (i.e., previously or presently overweight) would have lower levels of PA compared with college-aged females who were in the NOW group (i.e., had never been overweight). Instead, the results showed women in the PPOW group did not have a significantly different PA level than the NOW group, although their means were opposite to the hypothesized direction (i.e., PPOW greater than NOW).

The results of this study were also not consistent with the previous literature examining PA patterns among normal weight and overweight individuals. Most previous studies have found that individuals who are currently overweight generally have significantly lower PA levels than those who are not overweight (Cooper et al., 2000; Trost et al., 2002). However, direct comparisons to the literature cannot be made as our PPOW group included women who had been previously overweight but were no longer overweight. There are several possible explanations as to why the present study did not find a significant difference between the two weight groups.

One reason could be because the PPOW group was composed of two subgroups of women. Although women in the PPOW group had all been overweight at some point in their lives, their current weight statuses were not all the same. For example, women could have been currently normal weight but had been overweight in their past. Alternatively, they could have been overweight at the time of the study. Either way, women with overweight experiences were classified into the PPOW group. Of the 44% of women in the PPOW group who were presently overweight, 96% of them additionally reported a history of being overweight in either childhood or adolescence or both. Despite similar overweight backgrounds among the women in the PPOW group, present body weight may have affected current PA behaviour more than weight history. The now

normal weight women who had been overweight in the past may have consciously chosen to elevate their current PA level to prevent regaining weight previously lost. A study by Jakicic et al. (1999) found that individuals who had been overweight previously but who had lost weight had to exercise above the recommended guidelines (i.e., greater than 280 minutes per week) over an 18-month exercise intervention to maintain their weight loss. Again, even with inferred similar experiences in their overweight past, current body weight may ultimately be the determining factor in a woman's present PA behaviour.

Although the classification system used to group women may have contributed to our non-significant findings, the decision to group the previously overweight and presently overweight was made for several reasons. Importantly, there was large overlap between these two groups, with 96% of those who were currently overweight also being previously overweight. Finally, the shared history of overweight experiences was hypothesized to construct a similar mindset in these women surrounding weight issues and PA behaviours, regardless of their current body size. Despite all women in this group having a history of being overweight, current weight status differed. It is possible that current body weight may affect recent thoughts and behaviours (such as those reported) more so than past weight status, making it more difficult to find between group differences in our sample.

The Perceived Weight History Questionnaire used in this study was developed specifically for this research question and sample demographics (i.e., female participants between 17-25 years old) based on existing questionnaires (Annis et al., 2004; NHANES, 2010) regarding perceived weight history. Therefore, the reliability and validity of this

developed questionnaire have yet to be investigated. Accurate recall and perception of past weight values with the Perceived Weight History Questionnaire may have also contributed to our non-significant results as women tend to overestimate their size when asked to self-report their own weight. Even though recall has been validated as an accurate measure of previous weight within weight history research (Casey et al., 1991; McGuire et al., 1999; Stevens et al., 1990), there was still the possibility for either under- or overestimation in regards to perceived past weight or shape.

Another explanation for the lack of significant differences in PA levels between the NOW and PPOW groups could have resulted from the use of BMI to classify weight status. One of the criteria used to classify women into the two weight groups was BMI. Even though BMI is widely used and accepted as a weight classification instrument by the World Health Organization (2006) for its ease and affordability, this method still poses limitations. BMI does not take into account an individual's body frame size or muscularity. Therefore, a woman who has an athletic body frame with a greater muscle mass may have a BMI greater than 25 and as a result be incorrectly classified as overweight based on the World Health Organization's guidelines. Of the women who had been classified as overweight, 25% of those women had a calculated BMI between 25 and 26, just over the critical value of 25 to be classified as overweight. As well, 30% of the women in the PPOW group who had been classified as overweight from their past also had a calculated BMI from the last three years between 25 and 26, again just over the critical value to be classified as overweight. Even though these women met the BMI criteria set out to be classified into the PPOW group, these women may not be overweight in regards to fat mass but may simply have a larger body frame or more

muscle mass. This possibility would be consistent with the relatively active nature of the group.

In addition, from this same group of women with a BMI just slightly over 25 and as a result categorized as overweight, several of them additionally reported being an overweight child or adolescent. Thus, it may be the case that these women had an even larger overweight BMI score in childhood or adolescence and have experienced significant weight loss to get their BMI down closer to the normal range below 25. To achieve and maintain this weight loss, these women may not engage in the typical low PA levels associated with being an overweight woman. As mentioned previously, higher levels of PA may be the best solution to avoid regaining any weight that was lost previously (Jakicic et al., 1999). Elevated levels of PA could even produce greater muscle mass within these women that could also falsely push them into the overweight category. On the opposite end of the overweight spectrum, 20% of the women in the PPOW group had a BMI greater than 30 and would be classified as obese. Therefore, the extreme BMI scores spanning the whole overweight spectrum may have contributed greatly to the large variation in PA levels for the women in the PPOW group.

Perception of PA intensity could also be a reason why between-group differences failed to exist in this sample as participants self-classified the intensity of the PA in which they participated. Overweight individuals often report a higher rate of perceived exertion after PA compared with normal weight individuals (Ekkekakis & Lind, 2006). Therefore, what an overweight woman perceives as vigorous PA may only be perceived as moderate activity by a normal, healthy weight woman. Vigorous activity requires more energy to complete. For that reason, vigorous activity has been assigned a higher MET

weight in the IPAQ score calculation. The potential differences in perception of PA intensity mentioned above between an overweight and normal weight woman may have impacted the reported PA levels in this study. An overweight woman's altered perceptions of activity intensity and physical exertion may have led to over-reporting the amount of vigorous PA done in a 7-day period. As a result, the IPAQ scores in the PPOW group may have been slightly skewed to the higher end of the scale.

The self-perception of past body weight or body size may have also been a factor. As it would be impossible to verify if the women who reported being overweight in their past were in fact overweight as a child or adolescent, we had to rely on accurate perceptions and recollection of their previous weight. Compared to men, women are more likely to perceive themselves as being overweight and these perceptions are strongly correlated with weight loss attempts (i.e., PA, dieting; Lemon, Rosal, Zapka, Borg, & Andersen, 2009). A woman who perceived herself to be overweight but in actuality was not, may have been classified into our PPOW group when she really should have been placed in the NOW group. This potentially could have impacted PA trends within the groups as these women may not have the typical PA behaviour seen in actual overweight women in the PPOW group.

From these self-perceptions, even though possible inaccuracies may exist, an individual's body image develops. In previous studies, body dissatisfaction has been linked to increased PA behaviour. Among girls, greater body dissatisfaction has been associated with higher levels of PA (Jensen & Steele, 2009). As overweight women tend to report more dissatisfaction with their body (Annis et al., 2004), this may be one explanation for the higher PA levels reported by the women in the PPOW group. The

dissatisfaction felt towards their body may have served as motivation for the women in the PPOW group to engage in greater amounts of PA as a way to improve their body satisfaction.

Participant demographics may have also been responsible for no significant between-group differences in PA. The majority of the women were completing either a physical education or kinesiology degree. Therefore, these women most likely have greater knowledge about the benefits and importance of an active lifestyle through their education compared with college-aged women studying outside the health field. Given that these young women chose to study in a health and physical education program, it is likely they possess a certain level of enjoyment with regards to learning about and participating in physical activities. In a review conducted by Trost et al., (2002) examining the correlates of adult PA, they found enjoyment to have a strong positive relationship with PA. A higher level of enjoyment regarding PA is strongly associated with higher levels of PA participation (Booth, Owen, Bauman, Clavisi, & Leslie, 2000; Leslie et al., 1999). In addition, adults who understand and expect certain benefits to emerge from PA tend to have more PA participation (Clark, 1999; Mitchell & Olds, 1999; Rodgers & Gauvin, 1998; Simonsick, Guralnik, & Fried, 1999). Thus, women in physical education and kinesiology programs will likely have a greater understanding of, appreciation of, and expectations surrounding PA, which may have influenced their own PA. For the overweight women in this study, their education background may have allowed them to overcome the obstacles overweight women typically face with PA participation.

Finally, it is also possible that higher than expected PA in the PPOW group may have been related to self-presentational concerns. This self-presentational strategy may be one reason some of the overweight women in this study reported higher levels of PA than typically seen within the overweight population. By associating themselves with the positive stereotypes of being an exerciser (i.e., hardworking, attractive, healthy), it would hopefully separate them from typical stigmas surrounding overweight individuals. Previous research has shown that, although individuals who are described as overweight are perceived more negatively than those described as normal weight or underweight, being described as physically active can overcome those negative stereotypes (Martin Ginis & Leary, 2006). This suggests negative stereotypes typically associated with being overweight (i.e., lazy, unattractive, less sociable) may be disregarded if the individual is a known exerciser. Thus, overweight individuals may exercise more, or at least report exercising more, to be perceived more positively by others.

### **Research Question #2: Appearance Commentary and Physical Activity**

The second research objective examined the relationship between the frequency of negative and positive AC and current PA behaviour in college-aged females. The results of the second objective supported our hypotheses. In regards to negative commentary, our hypothesis that college-aged women who reported a higher frequency of negative AC would have lower levels of PA was supported. Further, our hypothesis that greater positive AC reported by college-aged women would be associated with higher levels of PA was also supported.

The significant relationships between AC and PA in this study are consistent with previous literature, where more frequent negative AC is associated with low levels of PA

and more frequent positive AC is associated with higher levels of PA (Faith et al., 2002; Storch et al., 2007). The lower PA levels associated with a history of negative AC may occur for several reasons. First, it may simply be an avoidance coping mechanism. A young woman who has been criticized about her body in the past may feel apprehensive and likely would avoid environments in the future that place unwanted focus on her body (i.e., PA settings; Bauer, Yang, & Austin, 2004; Fekkes et al., 2003; Park & Pinkus, 2009). Second, the association between hurtful appearance comments and PA can lead to less sport enjoyment (Faith et al., 2002). As mentioned previously regarding the review of PA correlates, enjoyment has a strong positive correlation with adult PA participation (Troost et al., 2002). The lack of enjoyment reported by individuals who receive frequent negative appearance comments is concerning for PA promotion and adherence. Third, individuals who report frequent teasing may feel socially isolated and would not receive the important social support that is associated with higher adult PA participation (Troost et al., 2002). Given the social nature of PA, it is not surprising children who report a higher frequency of weight criticisms during PA show a preference for sedentary activities in the future (Faith et al., 2002).

Lastly, feelings of apprehension about the body, stemming from frequent negative appearance comments, may be heightened further in a PA environment. Past negative appearance comments are associated with poor adult body image (Cash, 1995; Jackson et al., 2000; Thompson & Heinberg, 1993; Thompson & Psaltis, 1988). Additionally, poor body image has been identified as a negative correlate of adult PA behaviour that results in less activity participation (Troost et al., 2002). Thus, a domino effect of one leading to another may ultimately result in less PA.



Social physique anxiety, an indicator of poor body image, occurs when one is concerned about receiving evaluations, most likely negative, from others (Hart, Leary & Rejeski, 1989). Social physique anxiety has been identified as a potential barrier to both enjoyment and participation in PA (Bain, Wilson, & Chaikind, 1989; Carron & Prapavessis, 1997; Treasure, Lox, & Lawton, 1998). Women who have received frequent negative appearance comments in the past may not be as willing to put themselves in a vulnerable situation, like a gym setting, where there is the potential for negative evaluation. In one study examining social anxiety within an exercise environment, Gammage, Martin-Ginis, and Hall (2004) manipulated self-presentational efficacy to determine the influence it had on college-aged women. The women placed in the low efficacy group (i.e., mirrors visible, male confederate present, video camera to record exercise class, name tags, and standard clothing provided) had high levels of exercise-related state social anxiety, physical appearance anxiety and social physique anxiety (Gammage et al., 2004). They also reported looking less forward to the upcoming exercise session than women in a high efficacy group. It is important to note that all the negative emotions reported by the women in the low efficacy group, as a result of the manipulations, occurred without the participants actually participating in any exercise session containing the potential environmental threats. The mere anticipation of participating in an exercise session under those anxiety-provoking conditions was enough to induce a negative emotional response. A similar anticipated risk may be perceived by the women in this study with a past of frequent negative AC. The anticipation of potential negative body evaluations may be powerful enough to create feelings of anxiety, acting

as a barrier that prevents future PA participation (Bain et al., 1989; Leary, 1992; Treasure et al., 1998).

Another aspect that may add to anxious feelings within the PA environment is clothing. The clothing typically worn during PA participation is intended to make body and limb movement easier and allow for thermoregulation. Therefore, exercise clothing is designed to be less bulky as to not restrict movement. The thinner, more flexible, clothing material used to make exercise attire may not conceal the physique as much as clothing worn throughout the day. A woman who has received frequent negative comments about her body may be uncomfortable wearing exercise clothing that has the potential to display her body shape. For that reason, women tend to report a preference for clothing that does not emphasize the physique (i.e., loose fitting shorts and t-shirts) as opposed to tight, fitted clothing typically associated with aerobics fashion attire (Crawford & Eklund, 1994; Eklund & Crawford, 1994). Even with loose-fitting clothing, some women may find shorts and a t-shirt do not conceal enough or prevent their body from negative evaluation, and as a result negative comments. Thus, anxiety associated with potential body evaluation can act as another potential barrier to PA participation within this subgroup of women.

There are several explanations for the higher PA levels associated with positive AC. First, women who have received frequent appearance compliments in their past tend to have less body image disturbance and higher self-esteem (Herbozo & Thompson, 2006). A more positive body image and greater confidence from frequent positive comments may motivate these women to participate in greater amounts of PA as higher self-efficacy was found to be a strong, positive correlate of adult PA in the review

conducted by Trost et al. (2002). Second, individuals who typically receive more positive appearance comments are more likely to make downward social comparisons towards others around them (i.e., to perceived inferior targets) which often lead to an overall positive feeling about themselves afterwards (Bailey & Ricciardelli, 2010). Therefore, positive comments from the past may act as a buffer against a potentially threatening exercise environment as these individuals generally perceive themselves to be superior to those around them. Unlike a history of negative appearance comments that seem to induce anxious feelings, a history of positive comments may protect an individual from being susceptible to a potentially threatening social environment that displays the physique.

However, it is also possible that motivation from positive comments to participate in greater amounts of PA may originate from feelings of apprehension about the body. Although positive AC most often leads to a positive outcome (i.e., greater self-esteem, satisfaction), positive commentary does not always produce a positive effect. In two studies, women reported positive appearance comments led them to greater amounts of body image disturbance (Herbozo & Thompson, 2006), more specifically greater body dissatisfaction (Calogero et al., 2009). Even though the intent of a positive comment is to compliment the individual, it may remind the recipient that her appearance is always being evaluated, bringing unwanted focus to the body and possibly creating dissatisfaction. As mentioned previously, higher body dissatisfaction has been linked to greater PA participation (Jensen & Steele, 2009), as a strategy to improve body satisfaction. The dissatisfaction experienced from positive AC may be a result of expectation. Women who have received greater amounts of positive AC in the past may

come to expect appearance compliments in the future and use PA as a reinforcement strategy to maintain positive commentary. Also, the dissatisfaction that results from appearance compliments may not be as great as the dissatisfaction reported after negative AC. As a result, slight body dissatisfaction may encourage greater amounts of PA as opposed to restricting participation. Heinberg et al. (2002) argue that a moderate level of body image concern may motivate healthy eating and exercise behaviours. Any verbal appearance feedback, regardless of the intent, might induce concern about the body. However, there may be a critical point on the body dissatisfaction spectrum where it becomes a barrier to PA participation and no longer acts as a healthy motivator.

The analysis for the second research objective was taken one step further to examine the correlations within each of the two weight status groups. The only significant relationship was found within the PPOW group, where negative AC had a strong, negative relationship with PA. Individuals in the PPOW group, who had a history of being overweight or were currently overweight, who experienced a higher frequency of negative AC in their past had lower levels of PA as young adults. A similar relationship exists in overweight children who report more weight-related teasing; as they report a lower preference for active or social camp activities, such as PA (Hayden-Wade et al., 2005) as well as less sport enjoyment and actual lower participation levels (Faith et al., 2002).

Overweight individuals often report experiencing higher amounts of negative AC (Faith et al., 2002; Falkner et al., 1999; Hayden-Wade et al., 2005; Janssen et al., 2004; McLaren et al., 2004; Neumark-Sztainer et al., 2002; Wertheim et al., 2001) and report feeling more upset by those negative comments compared to normal weight individuals

(Hayden-Wade et al., 2005; Neumark-Sztainer et al., 2002; Quinlan et al., 2009). If a certain group (i.e., overweight individuals) is prone to higher amounts of negative commentary, the strength of the existing relationship between negative AC and PA appears to be stronger within this group. Whether the individuals in the PPOW group were currently overweight or had been overweight in their past, maladaptive strategies may have been adopted as a result of more frequent negative AC (i.e., dieting, purging, skipping meals; Neumark-Sztainer et al., 2002) looking for a “quick fix solution” to rid them of negative stigmas instead of an effective solution such as PA (Boutelle et al., 2002). By contrast, in the NOW group no significant correlations were found between both negative and positive AC and PA. However, similar directional trends were identified (i.e., more negative AC associated with less PA; more positive AC associated with more PA).

### **Research Question #3: Test of Moderation**

The third research objective sought to identify AC as a moderator between body weight and PA. None of the four hypotheses were supported with the results of the regression analyses. Neither negative nor positive AC successfully moderated the relationship between weight status and PA levels. To date a moderation analysis has not been conducted with these three variables; therefore there is no previous literature to directly compare to this objective’s results. The closest comparison is a mediation analysis conducted in children examining negative AC as a mediating factor between weight status and body image (Lunner et al., 2000). It was found that a history of negative AC did significantly mediate the relationship between weight status and body image. Therefore, AC may not be a strong enough predictor to increase the strength or

alter the direction of the relationship between weight status and PA but may simply better explain some of the variance when combined with weight status. Alternatively, AC may moderate the relationship between body weight and body image, but not PA behaviour itself.

In addition, there may have been specific characteristics of the AC that prevented a moderation effect from existing, such as: comment severity, interpretation and coping mechanisms. The comment's severity was not measured in the present study, but it has been shown that if the comment is perceived as more hurtful it will produce greater negative body image disturbances (Cash, 1995; Herbozo & Thompson, 2006). Perhaps the overall comment severity experienced by this group of young women was not severe enough to provoke a strong negative response to show moderation effects. Also, as mentioned previously, regardless of the comment's actual intent, the interpretation by the recipient can also affect the overall impact of the comment. An intended positive comment has the potential to produce a negative outcome (Calogero et al., 2009; Herbozo & Thompson, 2006), possibly altering the moderation effect between weight status and PA. Lastly, coping mechanisms to deal with AC may cushion any negative effects on PA behaviour. Coping mechanisms such as self-acceptance, self-protection by attributing negative outcomes to other's prejudiced attitudes, or confronting the source of commentary may have been used to deal with negative emotions (Li & Rukavina, 2008). This may be applicable to the women in this study because the AC measured was recall-based to assess commentary in their past. These women may have already dealt with and moved past negative AC that occurred as a child or adolescence, no longer allowing those comments to affect their current behaviour.

Two coping mechanisms that may directly apply to this sample of women, based on their reported PA rates, are compensation tactics to alter negative biases or stereotypes and weight loss. As our PPOW group reported higher PA levels than typically seen within an overweight population, this group may have tried to compensate for negative stereotypes and comments received in the past by over exaggerating actual PA levels in attempt to compensate for past negative evaluations (Li & Rukavina, 2008). This would be consistent with findings that being described as an exerciser can buffer the negative stereotypes associated with being overweight (Martin Ginis & Leary, 2006). Similarly, weight loss strategies, such as deliberately increasing PA levels, may have also occurred to distance themselves from negative stigmas and comments experienced in the past (Neumark-Sztainer et al., 1998; Puhl & Brownell, 2006). Any coping mechanism, not just the suspected ones discussed above, may have affected the overall impact on PA, preventing one, clear moderation effect from emerging in the third research objective. Further research should examine whether specific AC characteristics and coping strategies have more of a moderating effect on future PA behaviour, as the mere frequency of those comments does not appear to be a strong enough predictor variable itself.

### **Limitations**

Although this study has contributed to our knowledge of the relationship between weight status, verbal AC and PA, there are several limitations that should be acknowledged. It was difficult to recruit women with a history of being overweight and those who were currently overweight. These women may have been less likely to

volunteer for a study examining relationships regarding body weight issues due to the sensitive nature of the topic and negative experiences associated with being overweight.

Using BMI as one of the criteria to classify women into the weight status groups was another limitation. Although BMI is accepted as an accurate weight classification tool by the World Health Organization (2006), the index does not account for an individual's body composition. Therefore, some women classified into the PPOW group may have simply had a larger body frame or more muscle mass, not fat mass, that pushed their BMI score into the overweight category. This may have resulted in an incorrect overweight classification and assignment into the wrong weight group for analysis.

The IPAQ used to measure current PA behaviour in this study was also another limitation. Although our sample of college-aged women was expected to be a relatively active group, over-reporting of PA intensity and duration was still a significant limitation within this study. Over-reporting of PA was anticipated to occur prior to data collection based on results from Rzewnicki, Vanden Auweele, and De Bourdeaudhuij (2003). As a result, precautions were taken to minimize possible inaccuracies. However, even with visual and verbal instructions to draw participants' attention to key words in the IPAQ prior to study completion, over-reporting errors were still identified in data analysis.

The small variation in participant demographics was also a limitation for the present study. Our sample comprised mainly of college-aged women who were enrolled in a physical education or kinesiology degree program at Brock University and thus our results can be generalized only to this group. The majority of the women in this study were also a normal, healthy weight ( $BMI < 25$ ), as it was difficult to recruit overweight individuals for a study focused around body weight and AC. Overweight women may not



have wanted to volunteer for this study due to feelings of embarrassment or discomfort that surrounded past AC memories.

Finally, due to the correlational nature of the study, no conclusions can be drawn about whether AC actually leads to changes in PA women. Further, as a cross-sectional study, no conclusions can be drawn about whether appearance comments that occurred in different developmental periods (i.e., childhood, adolescence, young adulthood) affected PA differently. Causality statements regarding the temporal order of effects within this relationship also cannot be made, as the relationship may be cyclical.

### **Implications**

The theoretical implications of this study mainly contribute to the AC literature. Prior to the present study, the relationship between AC and PA had not been investigated extensively. The few studies that had examined this relationship had focused mainly on negative AC (i.e., teasing), children, and had only looked at acute effects during PA as opposed to long-term effects. The results of this study strengthened our knowledge of the existing negative relationship identified between negative appearance comments and PA. The literature for positive AC was very limited in comparison to negative AC; therefore the significant positive relationship found in this study will contribute greatly to the gap in our understanding of the AC literature. These findings highlight the importance of investigating the effects of both negative and positive verbal AC.

The practical implications for the present study are important for PA promotion and barrier prevention programs. First, this study did not find significant differences in PA levels between normal, healthy weight and women with a history of being overweight. This provides an optimistic outlook for overweight women, as overweight

status does not automatically equate to an inactive lifestyle as previously thought.

Programs do not necessarily need to be modified to accommodate overweight individuals. Instead, intervention programs designed to increase PA levels should focus on helping overweight women overcome psychological barriers (i.e., negative comments, anxiety), as opposed to just physiological barriers (i.e., excess weight). Second, the results of this study indicate that positive AC is associated with greater PA participation. For that reason, PA promotion programs may want to consider incorporating positive feedback into their design as a means to increase participation. Positive encouragement and feedback from family members, friends, teachers and coaches may work to motivate individuals of any body shape or size to participate in PA.

Lastly, the negative relationship found between a history of negative AC and less PA participation as a young adult identified a significant psychological barrier to PA. This information can be used for intervention programs designed to take a more pre-emptive approach that attempts to prevent decreasing rates of PA participation. This information may be especially important for programs geared towards young girls, as girls typically have lower PA levels than boys (CFLRI, 2010), and participation levels decrease at substantially higher rates in girls through childhood (Sallis, 1993; Sallis et al., 1999) and into adolescence (Goran et al., 1998). Designing programs that not only aim to encourage more positive feedback but also work to reduce negative commentary may ultimately result in greater levels of PA participation. Negative AC (i.e., teasing) is reported to be a very common occurrence in childhood and adolescence (Cash, 1995); therefore, despite attempts to reduce negative comment frequency, it cannot be fully eliminated. As a result, PA intervention programs that incorporate a cognitive

behavioural component designed to teach children and adolescents how to cope with negative experiences, such as teasing, may be even more successful. Overall, the results of this study highlight the importance of establishing healthy behaviours, such as PA participation, early in life to prevent potential negative long-term effects from occurring in adulthood as a result of past negative feedback from others.

### **Future Directions**

Future studies should further examine PA patterns within an overweight sample of women to determine if PA behaviour differs between a slightly overweight or very overweight woman. The PA habits of women who have experienced significant weight loss to achieve a current normal weight will be particularly important to study for future intervention program development. Given the current obesity epidemic in Canada, there are a large number of overweight individuals who need to lose weight to achieve a healthy status. Several government initiatives have been implemented to develop programs intended to get children, adolescents and adults more active (i.e., Active Healthy Kids Canada, ParticipACTION, Stairway to Health). If these programs are successful, as planned, the number of individuals who will fit the “previously overweight” criteria will grow exponentially from the current number in society. Therefore, future research is needed to gain a better understanding of the exercise psychology behind successful weight loss and management, as this will be crucial in fighting the obesity epidemic. A weight-loss intervention program should not end after a goal weight has been reached on the scale. Initial weight loss is only the first step to achieving a healthy lifestyle. Thus, future longitudinal studies that monitor an individual’s progress after initial weight loss success will contribute greatly to the

literature. Future studies should also work to develop an improved weight classification system that provides a better overall representation of an individual's past and present weight status that takes into account all relevant criteria (i.e., perception of shape, body composition).

Future research should also examine if the perceived effect of the AC, not just the frequency, has a significant relationship with PA as well. The source of AC (i.e., family member, peer, friend) may also affect the impact the comment has on behaviour and should be investigated further. Future studies should focus on positive commentary and behaviour as there are still apparent gaps within this research area but encouraging trends leading to higher PA levels. Body image factors such as body dissatisfaction, social physique anxiety or investment may moderate the relationship between AC and PA behaviour and should be explored further.

Lastly, future studies should determine if similar results found in college-aged women occur in college-aged men and other age groups (i.e., middle-aged and older adults) with regards to weight status, AC and PA. It is possible that verbal AC may impact these groups differently than college-aged women. Future studies should also investigate the impact of AC on PA using objective measures (i.e., pedometers) to determine if objective measures of PA would produce similar results to self-reported data. Experimental designs will also provide valuable information regarding the causal relationship between AC and PA. Future studies should further explore the association between positive AC and PA levels identified in this study to see if manipulating the frequency of appearance compliments a woman receives can in fact increase PA levels over a certain period of time.

## **Conclusion**

In conclusion, the present study examined the relationship between weight status, appearance-related commentary and PA in college-aged women. We did not find a significant difference in PA levels between our NOW and PPOW group, which may have been the result of our sample's demographics. We did find significant relationships between both frequency of negative and positive AC and PA. The more frequently negative appearance comments occurred in the past, the lower the PA levels were as a young adult. However, a history of frequent positive appearance comments was associated with higher PA levels as a young adult. Lastly, with our moderation analysis we found AC was not a significant moderator between weight status and PA. Overall, the results of this study demonstrate that AC experienced in the past has the potential to affect PA behaviour into adulthood.

## References

- Active Healthy Kids Canada. (2010). Healthy habits start earlier than you think: The active healthy kids Canada report card on physical activity for children and youth 2010. Toronto, ON.
- Adami, G. F., Gandolfo, P., Campostano, A., Meneghelli, A., Ravera, G., & Scopinaro, N. (1998). Body image and body weight in obese patients. *International Journal of Eating Disorders*, 24, 299–306.
- Adami, G. F., Meneghelli, A., Bressani, A., & Scopinaro. (1999). Body image in obese patients before and after stable weight reduction following bariatric surgery. *Journal of Psychosomatic Research*, 46, 275–281.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swartz, A. M., Strath, S. J.,...Leon, A. S. (2000). Compendium of physical activities: An update of activity codes and MET intensities. *Medicine & Science in Sports & Exercise*, 32, 498-504.
- Ainsworth, B. E., Macera, C. A., Jones, D. A., Reis, J. P., Addy, C. L., Bowles, H. R., & Kohl III, H. W. (2006). Comparison of the 2001 BRFSS and the IPAQ physical activity questionnaires. *Medicine & Science in Sports & Exercise*, 38, 1584-1592.
- Annis, N. M., Cash, T. F., & Hrabosky, J. I. (2004). Body image and psychosocial differences among stable average weight, currently overweight, and formerly overweight women: The role of stigmatizing experiences. *Body Image*, 1, 155-167.

- Ata, R. N., Ludden, A. B., & Lally, M. M. (2007). The effects of gender and family, and media influences on eating behaviours and body image during adolescence. *Journal of Youth & Adolescence*, 36, 1024-1037.
- Aubrey, J. S. (2006). Effects of sexually objectifying media on self-objectification and body surveillance in undergraduates: Results of a 2-year panel study. *Journal of Communication*, 56, 366-386.
- Bailey, S. D., & Ricciardelli, L. A. (2010). Social comparisons, appearance related comments, contingent self-esteem and their relationships with body dissatisfaction and eating disturbance among women. *Eating Behaviors*, 11, 107-112.
- Bain, L. L., Wilson, T., & Chaikind, E. (1989). Participant perceptions of exercise programs for overweight women. *Research Quarterly for Exercise & Sport*, 60, 134-143.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality & Social Psychology*, 51, 1173-1182.
- Bauer, K. W., Yang, Y. W., & Austin, S. B. (2004). 'How can we stay healthy when you're throwing all of this in front of us?' Findings from focus groups and interviews in middle schools on environmental influences on nutrition and physical activity. *Health Education & Behavior*, 31, 34-46.

- Benas, J. S., & Gibb, B. E. (2008). Weight-related teasing, dysfunctional cognitions, and symptoms of depression and eating disturbances. *Cognitive Therapy & Research*, 32, 143-160.
- Biddle, S. J. H., Whitehead, S. H., O'Donovan, T. M., & Nevill, M. E. (2005). Correlates of participation in physical activity for adolescent girls: A systematic review of recent literature. *Journal of Physical Activity & Health*, 2, 423-434.
- Booth, M., Owen, N., Bauman, A., Clavisi, O., & Leslie, E. (2000). Social-cognitive and perceived environment influences associated with physical activity in older Australians. *Preventative Medicine*, 31, 15-22.
- Bourdeaudhuij, I. D., Lefevre, J., Deforche, B., Wijndaele, K., Matton, L., & Philippaerts, R. (2005). Physical activity and psychosocial correlates in normal weight and overweight 11 to 19 year olds. *Obesity Research*, 13, 1097-1105.
- Boutelle, K., Neumark-Sztainer, D., Story, M., & Resnick, M. (2002). Weight control behaviours among obese, overweight, and nonoverweight adolescents. *Journal of Pediatric Psychology*, 27, 531-540.
- Brown, T. A., Cash, T. F., & Lewis, R. (1989). Body-image disturbances in adolescent female binge-purgers: A brief report of the results of a national survey in the U.S.A. *Journal of Child Psychology & Psychiatry*, 30, 605-613.
- Bryan, S. N., & Katzmarzyk, P. T. (2009). Are Canadians meeting the guidelines for moderate and vigorous leisure-time physical activity? *Applied Physiology, Nutrition, & Metabolism*, 34, 707-715.



- Calogero, R. M., Herbozo, S., Thompson, K. (2009). Complimentary weightism: The potential costs of appearance-related commentary for women's self-objectification. *Psychology of Women Quarterly*, 33, 120-132.
- Campaigne, B. N., Fontaine, R. N., Park, M. C., & Rymaszewski, Z. J. (1993). Reverse cholesterol transport with acute exercise. *Medicine & Science in Sports & Exercise*, 25, 1346-1351.
- Canadian Fitness and Lifestyle Research Institute (CFLRI). (2010). Canadian Health Survey: 2008 Physical Activity Monitor. Retrieved on July 15, 2010 from [http://www.cflri.ca/eng/levels/adult\\_levels.php](http://www.cflri.ca/eng/levels/adult_levels.php)
- Carron, A. V., & Prapavessis, H. (1997). Self-presentation and group influence. *Small Group Research*, 28, 500-516.
- Casey, V. A., Dwyer, J. T., Berkey, C. S., Coleman, K. A., Gardner, J., & Valadian, I. (1991). Long-term memory of body weight and past weight satisfaction: A longitudinal follow-up study. *The American Journal of Clinical Nutrition*, 53, 1493-1498.
- Cash, T. F. (1995). Developmental teasing about physical appearance: Retrospective descriptions and relationships with body image. *Social Behavior & Personality*, 23, 123-130.
- Cash, T. F., Counts, B., & Huffine, C. E. (1990). Current and vestigial effects of overweight among women: Fear of fat, attitudinal body image, and eating behaviors. *Journal of Psychopathology & Behavioral Assessment*, 12, 157-167.

- Cash, T. F., & Flemming, E. C. (2002). The impact of body-image experiences: Development of the body image quality of life inventory. *International Journal of Eating Disorders*, 31, 455-460.
- Cash, T. F., Jakatdar, T. A., & Williams, E. F. (2004). The body image quality of life inventory: Further validation with college men and women. *Body Image*, 1, 279-287.
- Caspersen, C. J., Powell, K. E., & Christensen, G. M. (1985). Physical activity, exercise and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100, 126-131
- Clark, D. O. (1999). Physical activity and its correlates among urban primary care patients aged 55 years or older. *Journal of Gerontology*, 54B, S41-S48.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioural sciences* (3<sup>rd</sup> ed.). Mahwah, NJ: Erlbaum.
- Collins, E. M. (1991). Body figure perceptions and preferences among preadolescent children. *International Journal of Eating Disorders*, 10, 199-208.
- Cooper, A. R., Page, A., Fox, K. R., & Misson, J. (2000). Physical activity patterns in normal, overweight and obese individuals using minute-by-minute accelerometry. *European Journal of Clinical Nutrition*, 54, 887-894.
- Cotman, C. W., & Engesser-Cesar, C. (2002). Exercise enhances and protects brain function. *Exercise & Sport Sciences Reviews*, 30, 75-79.

- Courneya, K. S., & Friedenreich, C. M. (1999). Physical exercise and quality of life following cancer diagnosis: A literature review. *Annals of Behavioural Medicine*, 21, 171-179.
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ...Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise*, 35, 1381-1395.
- Crawford, S., & Eklund, R. C. (1994). Social physique anxiety, reasons for exercise, and attitudes towards exercise settings. *Journal of Sport & Exercise Psychology*, 16, 70-82.
- Cronbach, L. J. (1987). Statistical tests for moderator variables: Flaws in analysis recently proposed. *Psychological Bulletin*, 102, 414-417.
- Davis, C. (1990). Weight and diet preoccupation and addictiveness: The role of exercise. *Personality & Individual Differences*, 11, 823-827.
- Dishman, R. K., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M., & Pate, R. R. (2004). Self-efficacy partially mediates the effect of a school-based physical-activity intervention among adolescent girls. *Preventive Medicine*, 38, 628-636.
- Dunlap, W. P., & Kemery, E. R. (1987). Failure to detect moderating effects: Is multicollinearity the problem? *Psychological Bulletin*, 102, 418-420.
- Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatric Adolescent Medicine*, 157, 733-738.

- Ekkekakis, P., & Lind, E. (2006). Exercise does not feel the same when you are overweight: The impact of self-selected and imposed intensity on affect and exertion. *International Journal of Obesity*, 30, 652-660.
- Eklund, R. C., & Crawford, S. (1994). Active women, social physique anxiety, and exercise. *Journal of Sport & Exercise Psychology*, 16, 431-448.
- Eyler, A. A., Brownson, R. C., Donatelle, R. J., King, A. C., Brown, D., & Sallis, J. F. (1999). Physical activity social support and middle- and older-aged minority women: Results from a US survey. *Social Science & Medicine*, 49, 781-789.
- Fabian, L., & Thompson, J. K. (1989). Body image and eating disturbance in young females. *International Journal of Eating Disorders*, 8, 63-74.
- Faith, M. S., Leone, M. A., Ayers, T. S., Moonseong, H., & Pietrobelli, A. (2002). Weight criticism during physical activity, coping skills, and reported physical activity in children. *Pediatrics*, 110, 1-8.
- Falkner, N. H., French, S. A., Jeffery, R. W., Neumark-Sztainer, D., Sherwood, N. E., & Morton, N. (1999). Mistreatment due to weight: Prevalence and sources of perceived mistreatment in women and men. *Obesity Research*, 7, 572-576.
- Faulkner, G. E., Arbour-Nicitopoulos, K. P., & Hsin, A. (2010). Cutting down one puff at a time: The acute effects of exercise on smoking behaviour. *Journal of Smoking Cessation*, 5, 130-135.
- Fea, C. J., & Brannon, L. A. (2006). Self-objectification and compliment type: Effects on negative mood. *Body Image*, 3, 183-188.

- Fekkes, M. M., Pijpers, F. I., & Verloove-VanHorick, S. P. (2003). Bullying behaviour and associations with psychosomatic complaints and depression in victims. *The Journal of Pediatrics*, *144*, 17-22.
- Foster, G. D., & Matz, P. E. (2002). Weight loss and changes in body image. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 405–413). New York, NY: Guilford Press.
- Fouts, G., & Burggarf, K. (2000). Television situation comedies: Female weight, male negative comments, and audience reactions. *Sex Roles*, *42*, 925-932.
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counselling psychology research. *Journal of Counseling Psychology*, *51*, 115-134.
- Fredrickson, B. L., & Roberts, T. (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, *21*, 173-206.
- Friedenreich, C. M., & Orenstein, M. R. (2002). Physical activity and cancer prevention: Etiologic evidence and biological mechanisms. *The Journal of Nutrition*, 3456-3464.
- Gammage, K. L., Martin Ginis, K. A., & Hall, C. R. (2004). Self-presentational efficacy: Its influence on social anxiety in an exercise context. *Journal of Sport & Exercise Psychology*, *26*, 179-190.
- Garaulet, M., Martinez, A., Victoria, F., Rerez-Llamas, F., Ortega, R. M., & Zamora, S. (2000). Differences in dietary intake and activity level between normal-weight

- and overweight or obese adolescents. *Journal of Pediatric Endocrinology & Metabolism*, 30, 253-258.
- Gleason, J. H., Alexander, A. M., & Somers, C. L. (2000). Later adolescents' reactions to three types of childhood teasing: Relations with self-esteem and body image. *Social Behavior & Personality*, 28, 471-480.
- Goran, M. I., Gower, B. A., Nagy, T. R., & Johnson, R. (1998). Developmental changes in energy expenditure and physical activity in children: Evidence for energy conservation in girls prior to puberty. *Pediatrics*, 101, 887-891.
- Gordon-Larsen, P., Nelson, M. C., & Popkin, B.M. (2004). Longitudinal physical activity and sedentary behavior trends—adolescence to adulthood. *American Journal of Preventive Medicine*, 27, 2777-2783.
- Gow, R. W., Trace, S. E., & Mazzeo, S. E. (2010). Preventing weight gain in first year college students: An online intervention to prevent the “freshman fifteen”. *Eating Behaviors*, 11, 33-39.
- Grilo, C. M., Wilfley, D. E., Brownell, K. D., & Rodin, J. (1994). Teasing, body image, and self-esteem in a clinical sample of obese women. *Addictive Behaviors*, 19, 443-450.
- Hart, E. A., Leary, M. R., & Rejeski, W. J. (1989). The measurement of social physique anxiety. *Journal of Sport & Exercise Psychology*, 11, 94-104.
- Harter, S. (1990). Self and identity development. In Felman, S. S., & Elliot, G. R. (Eds.), *At the threshold: The developing adolescent*. Cambridge, MA: Harvard University Press.

- Hartmann, T., Zahner, L., Pühse, U., Schneider, S., Puder, J. J., & Kriemler, S. (2010). Physical activity, bodyweight, health and fear of negative evaluation in primary school children. *Scandinavian Journal of Medicine & Science in Sports*, 20, 27-34.
- Hausenblas, H. A., & Fallon, E. A. (2006). Exercise and body image: A meta-analysis. *Psychology & Health*, 21, 33-47.
- Hayden-Wade, H. A., Stein, R. I., Ghaderi, A., Saelens, B. E., Zabinski, M. F., & Wilfley, D. E. (2005). Prevalence, characteristics, and correlates of teasing experiences among overweight children vs. Non-overweight peers. *Obesity Research*, 13, 1381-1392.
- Health Canada. (2003). Food and Nutrition: Body mass index (BMI) nomogram. Retrieved on August, 8, 2010, from [http://www.hc-sc.gc.ca/fn-an/nutrition/weights-poids/guide-ld-adult/bmi\\_chart\\_java-graph\\_imc\\_java-eng.php](http://www.hc-sc.gc.ca/fn-an/nutrition/weights-poids/guide-ld-adult/bmi_chart_java-graph_imc_java-eng.php)
- Heinberg, L. J., Thompson, J. K., & Matzon, J. L. (2002). Body image dissatisfaction as a motivation for health lifestyle change: Is some distress beneficial? In R. H. Striegel-Moore & L. Smolak (Eds.), *Eating disorders: Innovative directions in research & practice* (pp. 215–232). Washington, DC: American Psychological Association.
- Herbozo, S., & Thompson, J. K. (2009). Positive and negative appearance-related feedback and weight status. *Eating & Weight Disorders*, 14, 234-236.

- Herbozo, S., & Thompson, K. (2006). Appearance-related commentary, body image, and self-esteem: Does the distress associated with the commentary matter? *Body Image, 3*, 255-262.
- Holmbeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. *Journal of Consulting & Clinical Psychology, 65*, 599-610.
- Holmbeck, G. N. (2002). Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *Journal of Pediatric Psychology, 27*, 87-96.
- Hu, F. B., Manson, J. E., Stampfer, M. J., Colditz, G., Liu, S., Solomon, C. G., & Willett, W.C. (2001). Diet, lifestyle, and the risk of type 2 diabetes mellitus in women. *The New England Journal of Medicine, 345*, 790–797.
- International Physical Activity Questionnaire-Short. (2001). Retrieved on August 10, 2010, from [www.ipaq.ki.se](http://www.ipaq.ki.se)
- Jaccard, J., Turrisi, R., & Wan, C. K. (1990). *Interaction effects in multiple regression*. Newbury Park, CA: Sage.
- Jackson, T. D., Grilo, C. M., & Macheb, R. M. (2000). Teasing history, onset of obesity, current eating disorder psychopathology, body dissatisfaction, and psychological functioning in binge eating disorder, *Obesity Reviews, 8*, 451-458.
- Jakicic, J. M., Winters, C., Lang, W., & Wing, R. R. (1999). Effects of intermittent exercise and use of home exercise equipment on adherence, weight loss, and



- fitness in overweight women: A randomized trial. *Journal of the American Medical Association*, 282, 1554-1560.
- James, L. R., & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*, 69, 307-321.
- Janssen, I., Craig, W. M., Boyce, W. F., & Pickett, W. (2004). Associations between overweight and obesity with bullying behaviours in school-aged children. *Pediatrics*, 113, 1187-1194.
- Jensen, C. D., & Steele, R. G. (2008). Brief report: Body dissatisfaction, weight criticism, and self-reported physical activity in preadolescent children. *Journal of Pediatric Psychology*, 34, 822-826.
- Jones, D. C., & Crawford, J. K. (2006). The peer appearance culture during adolescence: Gender and body mass variations. *Journal of Youth & Adolescence*, 2, 257-269.
- Keery, H., Boutelle, K., van den Berg, P., & Thompson, K. (2005). The impact of appearance-related teasing by family members. *Journal of Adolescent Health*, 37, 120-127.
- Keltner, D., Capps, L., Kring, A. M., Young, R. C., & Heerey, E. A. (2001). Just teasing: A conceptual analysis and empirical review. *Psychological Bulletin*, 127, 229-248.
- Klem, M. L., Wing, R. R., McGuire, M. T., Seagle, H. M., & Hill, J. O. (1997). A descriptive study of individuals successful at long-term maintenance of substantial weight loss. *American Journal of Clinical Nutrition*, 66, 239-246.
- Kling, K. C., Hyde, J. S., Showers, C. J., & Buswell, B. N. (1999). Gender differences in self-esteem: A meta-analysis. *Psychological Bulletin*, 125, 470-500.

- Kostanski, M., & Gullone, E. (2007). The impact of teasing on children's body image. *Journal of Child & Family Studies, 16*, 307-319.
- Lantz, C. D., Hardy, C. J., & Ainsworth, B. E. (1997). Social physique anxiety and perceived exercise behaviour. *Journal of Sport Behavior, 20*, 83-93.
- Leary, M. R. (1992). Self-presentational process in exercise and sport. *Journal of Sport & Exercise Psychology, 11*, 94-104.
- Lemon, S. C., Rosal, M. C., Zapka, J., Borg, A., & Andersen, V. (2009). Contributions of weight perceptions to weight loss attempts: Differences by body mass index and gender. *Body Image, 6*, 90-96.
- Leslie, E., Owen, N., Salmon, J., Bauman, A., Sallis, J. F., & Lo, S. K. (1999). Insufficiently active Australian college students: Perceived personal, social, and environmental influences. *Preventative Medicine, 28*, 20-27.
- Li, W., & Rukavina, P. (2008). A review on coping mechanisms against obesity bias in physical activity/education settings. *Obesity Reviews, 10*, 87-95.
- Lo, W., Ho, S., Mak, K., Wong, Y., Lai, Y., & Lam, T. (2009). Prospective effects of weight perception and weight comments on psychological health among Chinese adolescents. *Acta Paediatrica, 98*, 1959-1964.
- Loland, N. W. (2000). The aging body: Attitudes toward bodily appearance among physically active and inactive women and men of different ages. *Journal of Aging & Physical Activity, 8*, 187-213.
- Lunner, K., Werthem, E. H., Thompson, J. K., Paxton, S. J., McDonald, F., & Halvaarson, K. S. (2000). A cross-cultural examination of weight-related teasing,

body image, and eating disturbance in Swedish and Australian samples.

*International Journal of Eating Disorders*, 28, 430–435.

Martin Ginis, K. A., & Leary, M. R. (2006). Single, physically active, female: The effects of information about exercise participation and body weight on perceptions of young women. *Social Behavior & Personality*, 34, 979-990.

Mattingly, B. A., Stambush, M. A., & Hill, A. E. (2009). Shedding the pounds but not the stigma: Negative Attributions as a function of a target's method of weight loss. *Journal of Applied Biobehavioural Research*, 14, 128-144.

McCabe, M. P., Ricciardelli, L. A., & Ridge, D. (2006). "Who thinks I need a perfect body?" Perceptions and internal dialogue among adolescents and their bodies. *Sex Roles*, 55, 409-419.

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin*, 114, 376-390.

McDonald, K., & Thompson, K. J. (1992). Eating disturbance, body image dissatisfaction, and reasons for exercising: Gender differences and correlational findings. *International Journal of Eating Disorders*, 11, 289-292.

McGuire, M. T., Wing, R. R., Klem, M. L., Lang, W., & Hill, J. O. (1999). What predicts weight regain in a group of successful weight losers? *Journal of Consulting & Clinical Psychology*, 67, 117-185.

McLaren, L., Kuh, D., Hardy, R., & Gauvin, L. (2004). Positive and negative body-related comments and their relationship with body dissatisfaction in middle-aged women. *Psychology & Health*, 19, 261-272.

- Miller, W. C., Koceja, D. M., & Hamilton, E. J. (1997). A meta-analysis of the past 25 years of weight loss research using diet, exercise, or diet plus exercise intervention. *International Journal of Obesity*, 21, 941-947.
- Mitchell, S. A., & Olds, R. S. (1999). Psychological and perceived situational predictors of physical activity: A cross-sectional analysis. *Health Education Research*, 14, 305-313.
- Morrow, M. L., Heesch, K. C., Dinger, M. K., Hull, H. R., Kneehans, A. W., & Fields, D. A. (2006). Freshman 15: Fact or fiction? *Obesity*, 14, 1438-1443.
- Muir, S. L., Wertheim, E. H., & Paxton, S. J. (1999). Adolescent girls' first diets: Triggers and the role of multiple dimensions of self-concept. *Eating Disorders*, 7, 259-270.
- Myers, A., & Rosen, J. C. (1999). Obesity stigmatization and coping: relation to mental health symptoms, body image, and self-esteem. *International Journal of Obesity Related Metabolism Disorders*, 23, 221-230.
- National health and nutrition examination survey (NHANES). (2010). Centers for Disease Control and Prevention. Retrieved on July 10, 2010, from [http://www.cdc.gov/nchs/data/nhanes/nhanes\\_09\\_10/whq\\_f.pdf](http://www.cdc.gov/nchs/data/nhanes/nhanes_09_10/whq_f.pdf)
- Neumark-Sztainer, D., Falkner, N., Story, M., Perry, C., Hannan, P.J., & Mulert, S. (2002). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. *International Journal of Obesity*, 26, 123-131.
- Neumark-Sztainer, D., Story, M., & Failsch, L. (1998). Perceived stigmatization among overweight African-American and Caucasian adolescent girls. *Journal of Adolescent Health*, 23, 264-270.

- Nowell, C., & Ricciardelli, L. A. (2008). Appearance-based comments, body dissatisfaction and drive for muscularity in males. *Body Image, 5*, 337-345.
- Park, L. E., & Pinkus, R. (2009). Interpersonal effects of appearance-based rejection sensitivity. *Journal of Research in Personality, 43*, 602-612.
- Pedersen, B. K., & Hoffman-Goetz, L. (2000). Exercise and the immune system: Regulation, integration, and adaptation. *Physiology Review, 80*, 1055-1081.
- Pierce, J. W., & Wardle, J. (1997). Cause and effect beliefs and self-esteem of overweight children. *Journal of Child Psychology & Psychiatry, 38*, 645-650.
- Prochaska, J. J., Hall, S. M., Humfleet, G., Muñoz, R. F., Reus, V., Gorecki, J., & Hu, D. (2008). Physical activity as a strategy for maintaining tobacco abstinence: A randomized trial. *Preventive Medicine, 47*, 215-220.
- Pronk, N. P., & Wing, R. R. (1994). Physical activity and long-term maintenance of weight loss. *Obesity Research, 2*, 587-599.
- Public Health Agency of Canada. (2010). Canada's physical activity guide to healthy active living. Retrieved on August 5, 2010, from <http://www.publichealth.gc.ca>
- Puhl, R., & Brownell, K. D. (2006). Confronting and coping with weight stigma: An investigation of overweight and obese adults. *Obesity, 10*, 1802-1815.
- Quinlan, N. P., Hoy, M. B., & Costanzo, P. R. (2009). Sticks and stones: The effects of teasing on psychosocial functioning in an overweight treatment-seeking sample. *Social Development, 18*, 978-1000.
- Radzewitz, A., Miche, E., Herrman, G., Nowak, M., Montanus, U., Adam, U., Stockmann, Y., & Barth, M. (2002). Exercise and muscle strength training and

- their effect on quality of life in patients with chronic heart failure. *European Journal of Heart Failure*, 4, 627-634.
- Ricciardelli, L. A., McCabe, M. P., & Banfield, S. (2000). Body image and body change methods in adolescent boys: Role of parents, friends, and the media. *Journal of Psychosomatic Research*, 49, 189-197.
- Rodgers, W. M., & Gauvin, L. (1998). Heterogeneity of incentives for physical activity and self-efficacy in highly active and moderately active women exercisers. *Journal of Applied Social Psychology*, 28, 1016-1029.
- Rzewnicki, R., Vanden Auweele, Y., & De Bourdeaudhuij, I. (2003). Addressing overreporting on the International Physical Activity Questionnaire (IPAQ) telephone survey with a population sample. *Public Health Nutrition*, 6, 299-305.
- Sallis, J. F. (1993). Epidemiology of physical activity and fitness in children and adolescents. *Critical Reviews in Food Science & Nutrition*, 33, 403-408.
- Sallis, J. F., Alcaraz, J. E., McKenzie, T. L., & Hovell, M. F. (1999). Predictors of change in children's physical activity over 20 months: Variations by gender and level of adiposity. *American Journal of Preventive Medicine*, 16, 222-229.
- Salmon, P. (2001). Effects of physical exercise on anxiety, depression, and sensitivity to stress: A unifying theory. *Clinical Psychology Review*, 21, 33-61.
- Shapiro, J. P., Baumeister, R. F., & Kessler, J. W. (1991). A three-component model of children's teasing: Aggression, humor, and ambiguity. *Journal of Social & Clinical Psychology*, 10, 459-472.

- Sherman, D. K., Iacono, W. G., & Donnelly, J. M. (1995). Development and validation of body rating scales for adolescent females. *International Journal of Eating Disorders, 18*, 327-333.
- Shomaker, L. B., & Furman, W. (2009). Interpersonal influences on late adolescent girls' and boys' disordered eating. *Eating Behaviors, 10*, 97-106.
- Shroff, H., & Thompson, K. J. (2004). Body image and eating disturbance in India: Media and interpersonal influences. *International Journal of Eating Disorders, 35*, 198-203.
- Simonsick, E., Guralnik, J. M., & Fried, L. P. (1999). Who walks? Factors associated with walking behaviour in disabled older women with or without self-reported walking difficulty. *Journal of American Geriatrics Society, 47*, 672-680.
- Slade, P. D. (1994). What is body image? *Behavior Research and Therapy, 32*, 497-502.
- Smolak, L., Levine, M. P., & Schermer, F. (1999). Parental input and weight concerns among elementary school children. *International Journal of Eating Disorders, 25*, 263-271.
- Stampfer, M. J., Hu, F. B., Manson, J. E., Rimm, E. B., & Willett, W. C. (2000). Primary prevention of coronary heart disease in women through diet and lifestyle. *New England Journal of Medicine, 343*, 16-22.
- Steinberg, L. (1999). *Adolescence* (5<sup>th</sup> ed.). New York, NY: McGraw-Hill.
- Stevens, J., Keil, J. E., Waid, L. R., & Gazes, P. C. (1990). Accuracy of current, 4-year, and 28-year self-reported body weight in an elderly population. *American Journal of Epidemiology, 132*, 1136-1163.

- Storch, E. A., Milsom, V. A., DeBraganza, N., Lewin, A. B., Geffken, G. R., & Silverstein, J. H. (2007). Peer victimization, psychosocial adjustment, and physical activity in overweight and at-risk-for-overweight youth. *Journal of Pediatric Psychology, 32*, 80-89.
- Strelan, P., Mehaffey, S. J., & Tiggemann, M. (2003). Self-objectification and esteem in young women: The mediating role of reasons for exercise. *Sex Roles, 48*, 89-95.
- Stormer, S., & Thompson, J. K. (1996). Explanations of body image disturbance: A test of maturational status, negative verbal commentary, social comparison, and sociocultural hypotheses. *International Journal of Eating Disorders, 19*, 193-202.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th Ed). Toronto, ON: Pearson.
- Thompson, J. K. (1991). Body shape preferences: Effects of instructional protocol and level of eating disturbance. *International Journal of Eating Disorders, 10*, 193-198.
- Thompson, J. K., Coover, M. D., Richards, K. J., Johnson, S., & Cattarin, J. (1995). Development of body image, eating disturbance, and general psychological functioning in female adolescents: Covariance structure modeling and longitudinal investigations. *International Journal of Eating Disorders, 18*, 221-236.
- Thompson, J. K., & Heinberg, L. (1993). A preliminary test of two hypotheses of body image disturbance. *International Journal of Eating Disorders, 14*, 59-64.
- Thompson, J. K., Heinberg, L., Altabe, M. N., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington: American Psychological Association.



- Thompson, J. K., & Psaltis, K. (1988). Multiple aspects and correlates of body figure ratings: A replication of Fallon and Roizen (1985). *International Journal of Eating Disorders*, 7, 813-817.
- Treasure, D. C., Lox, C. L., & Lawton, B. R. (1998). Determinants of physical activity in a sedentary obese population. *Journal of Sport & Exercise Psychology*, 20, 218-224.
- Trost, S. G., Owen, N., Bauman, A. E., Sallis, J. F., & Brown, W. (2002). Correlates of adults' participation in physical activity: Review and update. *Medicine & Science in Sports & Exercise*, 34, 1996-2001.
- Trost, S. G., Sirard, J. R., Dowda, M., Pfeiffer, K. A., & Pate, R. R. (2003). Physical activity in overweight and nonoverweight preschool children. *International Journal of Obesity*, 27, 834-839.
- Turner, C. H., & Robling, A. G. (2005). Mechanisms by which exercise improves bone strength. *Journal of Bone & Mineral Metabolism*, 23, 16-22.
- Wertheim, E. H., Koerner, J., & Paxton, S. J. (2001). Longitudinal predictors of restrictive eating and bulimic tendencies in three different age groups of adolescent girls. *Journal of Youth & Adolescents*, 30, 69-81.
- Wertheim, E. H., Paxton, S. J., Schutz, H. K., & Muir, S. L. (1997). Why do adolescent girls watch their weight? An interview study examining sociocultural pressures to be thin. *Journal of Psychosomatic Research*, 42, 345-355.
- West, S. G., Aiken, L. S., & Krull, J. L. (1996). Experimental personality designs: Analyzing categorical by continuous variable interactions. *Journal of Personality*, 64, 1-49.

World Health Organization. (2006). BMI classification. Retrieved on October, 15, 2010, from [http://apps.who.int/bmi/index.jsp?introPage=intro\\_3.html](http://apps.who.int/bmi/index.jsp?introPage=intro_3.html)

Zabinski, M. F., Saelens, B. E., Stein, R. I., Hayden-Wade, H. A., & Wilfley, D. E. (2003). Overweight children's barriers to and support for physical activity. *Obesity Research*, 11, 238–246.

### Appendix A: Group Classification Chart

Never Overweight (NOW)	Previously or Presently Overweight (PPOW)
Current BMI: $\geq 18.5$ and $\leq 24.9$	Current BMI: $\geq 18.5$
<p>WHQ: must meet <b><i>all four</i></b> of the possible criteria:</p> <p>(1) calculated BMI <math>\leq 24.9</math> at 1,2, <b><i>and</i></b> 3 years ago</p> <p><b><i>AND</i></b></p> <p>(2) answered “no” to being overweight at any point in their life</p> <p><b><i>AND</i></b></p> <p>(3) circled figure 1-4 on the Childhood Figure Rating Scale</p> <p><b><i>AND</i></b></p> <p>(4) circled figure 1-6 on Adolescent Figure Rating Scale</p>	<p>WHQ: must meet <b><i>at least one</i></b> of the four possible criteria:</p> <p>(1) calculated BMI <math>\geq 25</math> at 1,2, <b><i>or</i></b> 3 years ago</p> <p><b><i>OR</i></b></p> <p>(2) answered “yes” to being overweight at some point in their life (for at least 6 months)</p> <p><b><i>OR</i></b></p> <p>(3) circled figure 5, 6 or 7 on Childhood Figure Rating Scale</p> <p><b><i>OR</i></b></p> <p>(4) circled figure 7, 8, 9 on Adolescent Figure Rating Scale</p>

**Appendix B: Demographic Information**

Please complete the following information:

Gender: \_\_\_\_\_

Age: \_\_\_\_\_

Height: \_\_\_\_\_

Weight: \_\_\_\_\_

Major: \_\_\_\_\_

Have you ever thought you have had a clinical eating disorder? \_\_\_\_\_

Have you ever been diagnosed or treated for an eating disorder? \_\_\_\_\_

Are you a varsity athlete? (please circle)      YES              NO

### Appendix C: Perceived Weight History Questionnaire

1. Current Weight\_\_\_\_\_
2. Current Height\_\_\_\_\_
3. How long have you been at your **current** weight?
  - a. Less than 6 months
  - b. About 6 months
  - c. About a year
  - d. About 2 years
  - e. About 3 years
  - f. Longer than 3 years
4. How much did you weigh:
 

1 year ago?\_\_\_\_\_

2 years ago?\_\_\_\_\_

3 years ago?\_\_\_\_\_
5. How tall were you:
 

1 year ago?\_\_\_\_\_

2 years ago?\_\_\_\_\_

3 years ago?\_\_\_\_\_
6. Have you ever been overweight by at least 10lbs at any point in your lifetime (excluding pregnancy)?  
(circle ONE answer)

YES

NO

If YES...

- a. What age were you when you **were overweight**?\_\_\_\_\_
  - b. How long were you **overweight**?\_\_\_\_\_
7. At what age did you get your first period?\_\_\_\_\_

8. Using the figures below, circle the picture that best represents what YOU looked like as a child:



1



2



3



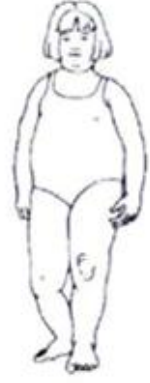
4



5



6



7

9. Using the figures below, circle the picture that best represents what YOU looked like as an adolescent:



1



2



3



4



5



6



7



8



9

### Appendix D: Verbal Commentary on Physical Appearance Scale (VCOPAS)

Sometimes, people say things that affect how we feel and think about our appearance. The following is a list of comments that may have been made about you. Please read each item and rate how often you think you have been the recipient of such a comment or similar comment (using the scale provided, never to always). Rate the items based on your exposure to the following comments within your lifetime.

1. Your outfit looks great on you.	1 Never	2	3 Sometimes	4	5 Always
2. You need to start watching what you eat.	1 Never	2	3 Sometimes	4	5 Always
3. You are pretty.	1 Never	2	3 Sometimes	4	5 Always
4. I wish I had a body like yours.	1 Never	2	3 Sometimes	4	5 Always
5. You've gained weight.	1 Never	2	3 Sometimes	4	5 Always
6. You are in great shape.	1 Never	2	3 Sometimes	4	5 Always
7. Don't you think you've eaten enough already?	1 Never	2	3 Sometimes	4	5 Always
8. You're looking kind of skinny.	1 Never	2	3 Sometimes	4	5 Always
9. Your facial skin looks good.	1 Never	2	3 Sometimes	4	5 Always
10. You shouldn't eat so late at night.	1 Never	2	3 Sometimes	4	5 Always
11. You have pretty eyes.	1 Never	2	3 Sometimes	4	5 Always
12. You need to start exercising to lose weight.	1 Never	2	3 Sometimes	4	5 Always
13. You have nice abs (abdominals).	1 Never	2	3 Sometimes	4	5 Always
14. Have you considered going on a diet?	1 Never	2	3 Sometimes	4	5 Always
15. You have a beautiful smile.	1 Never	2	3 Sometimes	4	5 Always
16. Your outfit makes you look fat.	1 Never	2	3 Sometimes	4	5 Always

17. I really like how those jeans fit you.	1	2	3	4	5
	Never		Sometimes		Always
18. Are you sure you want to eat such fattening foods?	1	2	3	4	5
	Never		Sometimes		Always
19. Have you gained weight?	1	2	3	4	5
	Never		Sometimes		Always
20. Your hair looks really good.	1	2	3	4	5
	Never		Sometimes		Always
21. You have a nice body.	1	2	3	4	5
	Never		Sometimes		Always



### Appendix E: International Physical Activity Questionnaire (short)

The questions are about your time you spent being physically active in the last 7 days. They include questions about activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

**Please answer each question even if you do not consider yourself to be an active person.**

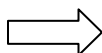
In answering the following questions,

- **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.
- **Moderate** physical activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

1a. During the last 7 days, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

Think about ONLY those physical activities that you did for at least 10 minutes at a time.

\_\_\_\_\_ days per week



1b. How much time in total did you usually spend on one of those days during vigorous physical activities?

OR

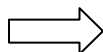
\_\_\_\_\_ hours \_\_\_\_\_ minutes

☐

None

2a. Again, think ONLY about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles in tennis? DO NOT include walking.

\_\_\_\_\_ days per week



2b. How much time in total did you usually spend on one of those days during moderate physical activities?

OR

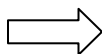
\_\_\_\_\_ hours \_\_\_\_\_ minutes

☐

None

3a. During the last 7 days, on how many days did you do **walk** for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure.

\_\_\_\_\_ days per week



3b. How much time in total did you usually spend walking on one of those days?

OR

\_\_\_\_\_ hours \_\_\_\_\_ minutes

☐

None

**Appendix F: Current Height and Weight Measurements****Height:** \_\_\_\_\_ inches      \_\_\_\_\_ cm**Weight:** \_\_\_\_\_ lbs      \_\_\_\_\_ kg**BMI:** \_\_\_\_\_**BMI classification:**Underweight  
<18.5Normal Weight  
18.5-24.99Overweight  
25.0-29.9Obese  
>30.0

## Appendix G: Ethics Clearance



Brock University  
Research Ethics Board  
Tel: 905-688-5550 ext. 3035  
Email: reb@brocku.ca

### Certificate of Ethics Clearance for Human Participant Research

DATE: 11/18/2010  
PRINCIPAL INVESTIGATOR: GAMMAGE, Kimberley - PEKN  
FILE: 10-092 - GAMMAGE  
TYPE: Masters Thesis/Project STUDENT: Lindsay Cline  
SUPERVISOR: Kimberley Gammage  
TITLE: The Effects of Appearance Commentary on the Relationship Between Weight Status and Physical Activity in Female University Students

#### ETHICS CLEARANCE GRANTED

Type of Clearance: NEW Expiry Date: 11/30/2011

The Brock University Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 11/18/2010 to 11/30/2011.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 11/30/2011. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page.

In addition, throughout your research, you must report promptly to the REB:

- Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
- New information that may adversely affect the safety of the participants or the conduct of the study;
- Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved:

Michelle McGinn, Chair  
Research Ethics Board (REB)

**Note:** Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.

## Appendix H: Letter of Invitation

### LETTER OF INVITATION

Date: Fall 2010/Winter 2011

**Title of Study:** The Effects of Appearance Commentary on the Relationship Between Weight Status and Physical Activity in Female University Students

**Principal Investigator:** Dr. Kimberley Gammage, Associate Professor, Department of Physical Education & Kinesiology, Brock University

**Principal Student Investigator:** Lindsay Cline, MA Candidate, Applied Health Science, Brock University

I, Dr. Kimberley Gammage, Associate Professor in the Department of Physical Education & Kinesiology at Brock University, invite you to participate in a research project entitled: "The Effects of Appearance Commentary on the Relationship between Weight Status and Physical Activity in Female University Students".

The purpose of this research project is to examine the relationship between weight status, appearance-related commentary, and physical activity in female university students. Appearance commentary is any verbal feedback, either positive or negative in nature, that an individual receives from others regarding his/her physical appearance.

Participation will take approximately 45 minutes to one hour. During your visit, you will be asked to complete a series of questionnaires. Objective height and weight measurements will also be taken.

Your participation will help clarify the relationship between weight status, appearance commentary and physical activity. You will have the opportunity to learn your body mass index, an indicator of body composition.

If you have any pertinent questions about your rights as a research participant, please contact the Brock University Research Ethics Officer (905 688-5550 ext 3035, [reb@brocku.ca](mailto:reb@brocku.ca))

If you have any questions, please feel free to contact me.

Thank you

**Dr. Kimberley Gammage**  
Associate Professor  
Dept. Physical Education & Kinesiology  
Brock University  
905-688-5550 (x3772)  
[kgammage@brocku.ca](mailto:kgammage@brocku.ca)

**Lindsay Cline**  
MA Candidate  
Applied Health Science  
Brock University  
[lc0500@brocku.ca](mailto:lc0500@brocku.ca)

**This study has been reviewed and received ethics clearance through Brock University's Research Ethics Board (file #10-092)**

## Appendix I: Informed Consent

Date: Fall 2010/Winter 2011  
 Project Title: The Effects of Appearance Commentary on the Relationship Between Weight Status and Physical Activity in Female University Students

**Principal Investigator:**  
**Dr. Kimberley Gammage, Associate Professor**  
**Dept. Physical Education & Kinesiology**  
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**kgammage@brocku.ca**

**Principal Student Investigator:**  
**Lindsay Cline, MA Candidate**  
**Applied Health Science**  
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### **INVITATION**

You are invited to participate in a study that involves research. The purpose of this study is to examine the relationship between weight status, appearance-related commentary (verbal comments made by others related to your physical appearance), and physical activity behaviour in female university students.

### **WHAT'S INVOLVED**

As a participant, you will be asked to complete a series of questionnaires. Objective measures of height and weight will also be obtained. Participation will take approximately 45 minutes to one hour of your time.

### **POTENTIAL BENEFITS AND RISKS**

Participants will have the opportunity to learn their BMI, an indicator of body composition. This information may aid in the development of physical activity interventions designed to increase participation levels and improve overall health. You may experience some discomfort due to the nature of the questions being asked; in this event, contact information for Dr. Gammage and student health services is provided (905-688-5550 ext. 3243, <http://www.brocku.ca/healthservices>). No known or anticipated physical risks are related to participation in this study.

### **CONFIDENTIALITY**

Any information that arises from participants will be treated with confidentiality. Please do not place your name or any identifying information on the questionnaires. Data collected during this study will be stored in a locked filing cabinet of the office of Dr. Gammage at Brock University and will be shredded 3 years following the completion of the study. Access to this data will be restricted to the principal investigator and the principal student investigator.

### **VOLUNTARY PARTICIPATION**

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may decide to withdraw from this study at any time and may do so without any penalty or loss of benefits to which you are entitled. After you submit your completed questionnaires, it will not be possible to withdraw, as your questionnaires will not be identifiable.

### **PUBLICATION OF RESULTS**

Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available. At your request you may receive a summary of results by contacting the principal or student investigator by email.

### **CONTACT INFORMATION AND ETHICS CLEARANCE**

If you have any questions about this study or require further information, please contact the Principal Investigator using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University (File # 10-092). If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, [reb@brocku.ca](mailto:reb@brocku.ca). Thank you for your assistance in this project. Please keep a copy of this form for your records.

### **CONSENT FORM**

I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: \_\_\_\_\_  
 Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Who:** Female, university students, excluding varsity athletes, and with no previous history or diagnosis of a clinical eating disorder

**Topic:** Relationship between body weight, appearance commentary & physical activity

[illegible]

## Appendix K: Debriefing Form

### Brock University, Faculty of Applied Health Sciences Debriefing Form

**Title of Study:** The Effects of Appearance Commentary on the Relationship Between Weight Status and Physical Activity in Female University Students

**Principal Researcher:** Dr. Kimberley Gammage, Associate Professor, Physical Education & Kinesiology, Brock University

**Principal Student Investigator:** Lindsay Cline, MA Candidate, Applied Health Science, Brock University

Thank you for participating in our study. In this study, we were looking at the relationship between weight status, appearance commentary and physical activity. Appearance commentary is any verbal feedback, either positive or negative in nature, an individual receives from others regarding his/her physical appearance. We were specifically interested to see if a person's childhood or adolescent weight and a history of appearance commentary affected their adult physical activity. Within our study, we used body mass index (BMI) classifications to indicate overweight status. However, a high BMI score (i.e., greater than 25) does not necessarily mean an individual is overweight or obese as BMI does not take into account fat-free mass (i.e., muscle mass). If you are interested in a follow-up test to determine your body composition (fat mass vs. fat-free mass) please contact us and we will set up an appointment to conduct that analysis.

If you experience any emotional discomfort due to the nature of the questionnaires please contact Brock University Student Health Services (905-688-5550 ext.3243, <http://www.brocku.ca/healthservices>) or Dr. Gammage 905-688-5550 ext. 3772). In addition, the following resources are provided for you: US Department of Health and Human Services: <http://www.4women.gov/bodyimage/> and Canadian Women's Health Network, <http://www.cwhn.ca/resources/faq/bodyImage.htm>. Please note, people come in all shapes and sizes.

If you have any questions, please feel free to contact the researchers (see below for contact information). Thank you again for your help.

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